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PHYSICAL GEOGRAPHY OF NEW YORK STATE.

BY

RALPH S. TARR.

PART X.—INFLUENCE OF PHYSIOGRAPHIC FEATURES UPON THE INDUSTRIAL DEVELOPMENT OF THE STATE.

THE LUMBERING INDUSTRY.—There are few places in the world in which the environment—climatic and topographic—have not produced an important influence upon human progress. But one would need to look far and wide to find a better illustration of this than is offered by the State of New York. In the main the State consists of a series of plains and much-dissected plateaux, comprised generally of broad valleys and rounded hill-slopes. Semi-mountainous here and there, the surface becomes truly so in two parts only—the Adirondacks and the neighborhood of the Catskills.

These mountains—rugged and rocky—are sparsely settled districts in an otherwise populous State. The unfavorable conditions of soil and topography for a long time discouraged settlement; but recently, on account of the more wide-spread development of the æsthetic sense, those who have leisure have sought those districts because of their varied and picturesque scenery and because of the lower summer temperature which results from their elevation.

The picturesqueness of these mountain districts is partly due to their elevation, as a result of which they have been carved into varied outlines, and partly to the effects of the glacier which has spread over practically the entire State. Moving slowly and irresistibly over the land, the great ice-sheet scoured the hilltops and dragged its load of boulder-clay into the valleys, clogging them

here and there, and sometimes transforming them to lakes, sometimes causing the streams to choose new courses, along which they have since dug their channels, carving gorges in the rocks and leaping from layer to layer in cascades, rapids and falls. Thus, by the effect of glaciation, a new beauty has been added to a region already picturesque.

In working upon the hard rocks of the mountains, the glacier has swept off the soil that previously existed, and over large areas has left in its place either bare ledges or a boulder-strewn surface. Neither is the slope too great, nor the climate too rigid, for successful agriculture in most of this mountainous tract; but as a result of the glacial accident the soil is either poor or entirely lacking. Much the same is true concerning the higher hills of the plateau region in southern New York. It has, therefore, not been worth the while to clear off the forests, as has been done elsewhere, so that the hilltops and mountain slopes are still wooded, furnishing a forest reserve long after one would have existed in a more level region. In this respect the Adirondacks and the Catskills resemble northern New England rather than the remainder of New York.

Lumbering, as an industry, is one of the few occupations that are available for those who would dwell among these mountains; for minerals are few and mostly of little value, while building-stones, which might be of use, are too remote from market. Removal of the forests has proceeded so far that little of the primitive growth remains, and even though large sections of the Adirondacks are inaccessible, except on foot, the lumbering operations have extended nearly all over their slopes. This has been rendered possible here, as in Maine, partly by reason of the climate, and partly, once more, by reason of the influence of the glacial period. The cold winter freezes the ponds, swamps and streams, and permits heavy snowfall, which levels over the surface, burying the logs and boulders, thus permitting sledging in the winter, so that supplies may be drawn into the lumber camps and logs be hauled out from the woods. The heavy snows of the steep slopes supply the necessary torrents of spring for the removal of the logs down to sawmills.

The effect of the glacial period upon this industry is primarily in the formation of lakes, which act as storage reservoirs for the water supply needed by the lumbermen who are driving their logs down stream. Thus a region unfitted for the dense population of an agricultural district is sparsely occupied by those whose business is lumbering. A road map of New York State shows a remarkable

blank in the hilly districts of the plateau of Cattaraugus County, (Fig. 1) in the Catskills and the Adirondack.

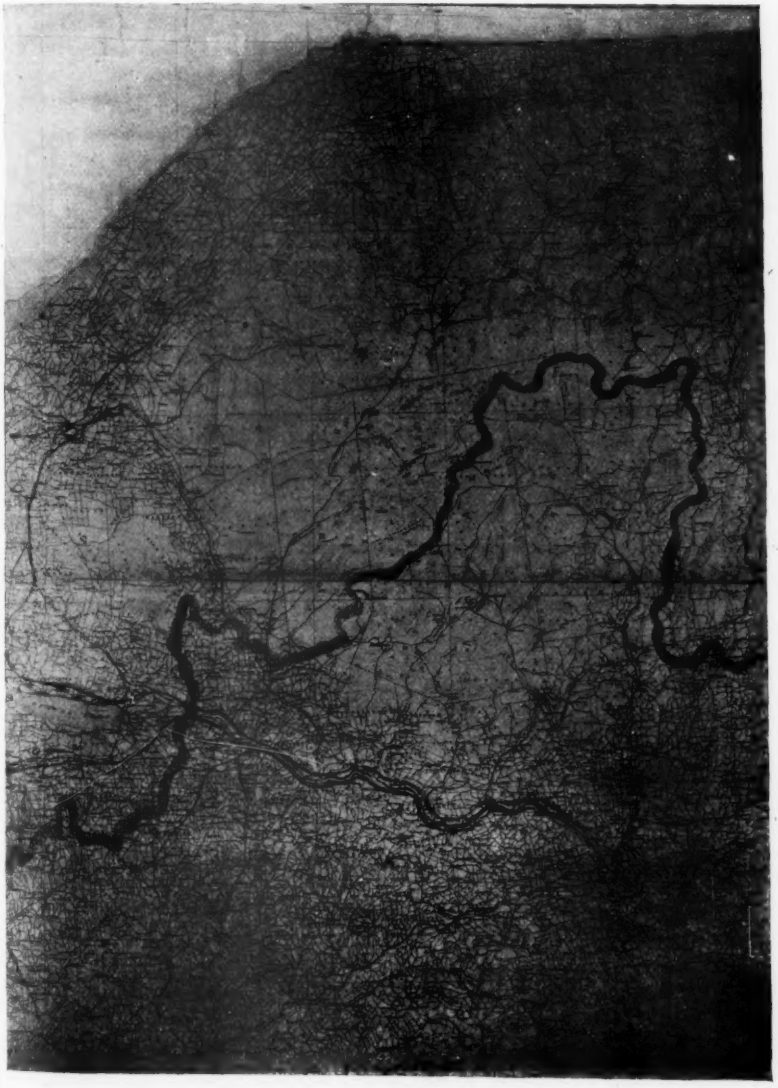

FIG. 1.—ROAD MAP.

The lumbering industry of the mountain districts has naturally had a distinct influence upon the industries of the sections round about. Where hemlock bark is easily accessible, tanneries, and leather work in general, have been possible. Sawmills, lumber mills, paper mills and other industries using timber have naturally developed nearby.

THE AGRICULTURAL INDUSTRY.— The glacial accident has stamped its effects upon the entire State. No doubt before the ice came there was a residual soil caused by rock decay and not unlike that now covering the surface in the more southern States; and no doubt this same kind of soil covered all of New England. This soil was almost entirely swept away, and in its place was set down the present glacial soil, consisting for the most part of a mixture of clay and boulders, here and there of poor quality, but in general strong and favorable to agricultural pursuits. One unacquainted with the explanation, but knowing well the New England and New York region, would scarcely recognize in the two contrasted kinds of soils a single product of ice action. In New England the surface is often so boulder-strewn that it at times seems a wonder that any agriculture should ever have been attempted there; but in New York, outside of the mountainous eastern section, there are so few boulders upon the surface that one rarely sees a stone wall—one of the characteristic features of New England scenery. This difference is due to the kind of rock which the ice found to carry. In New England it bore granite and other hard fragments; in New York, usually softer shales and limestones. Granite rocks were supplied from Canada, it is true; but in their long journey these were generally ground to clay, though here and there "hard heads," which have escaped comminution, may still be seen on the surface. In the neighborhood of the Adirondacks, and other sections where the rocks are hard, the glacial soil closely resembles that of New England.

This soil of glacial origin varies greatly from place to place, so that innumerable minor influences of physiography upon occupations are found. There are glacial plains of compact clay soil that produce crops of apples and pears; there are very extensive beaches of gravel,—the seats of vineyards; there are thin soils, suitable only for pasturage; and there are sandy stretches of little value to the agriculturist. Some sections are smooth and regular; others are so hummocky that farming must almost be done by hand; and some portions of a farm are level, others irreg-

ular, some with good soil, others poor. It is along the terminal moraine that the most marked irregularities are found.

The rounded preglacial topography was rendered even less irregular by the ice visit. Hills were lowered by ice-scouring and valleys partly filled with the debris. Therefore, since it left a good soil, the glacier, by smoothing the surface somewhat, made the greater part of the State better adapted to the great agricultural interests which have since developed than it was before the glacial period.

Under conditions of variable soil and irregularity of topography an exceedingly varied agricultural interest has arisen in the State. It has not depended entirely upon the soil, but in part upon the climate and in part upon the needs of the people, developed through the creation of industries of other kinds than agriculture. The influence of climate, for instance, is well illustrated by the important fruit-belts along the shores of lakes Erie, Ontario, Keuka, Seneca and Cayuga, and also along the broad estuary of the Hudson river. The influence arising from the demands of people who are engaged in other industries is illustrated in the neighborhood of each of the cities of the State, where many men are engaged in raising crops almost exclusively for consumption in the cities.

But while these other influences must be considered, the most directly important controlling force in the agricultural development of the State is undoubtedly the soil itself. The glacial soil is strong, and will stand a great deal of unwise culture, although in time even the best becomes exhausted if too heavy a drain is made upon it. Soils of residual origin have been caused by the decay of rocks, during which most of the soluble material has been leached out, although enough is still stored up there to supply plants with the necessary food, and do it so readily that at first wonderfully rich crops are produced; but ere long this abundance of plant food is exhausted and the soil is run down, and has its fertility restored only with great difficulty. This is very clearly illustrated in the overworked and abandoned plantations of the South.

A glacial soil, on the other hand, being composed of rock fragments scoured from the ledges and by the grinding of boulders together, consists of many undecayed, or only partially decayed, rock fragments. These, under the action of frost, or the effect of roots of plants and other agents of rock decay, are slowly furnishing to the glacial soils the very plant food that the vegetation needs. There is, therefore, a steady supply of the elements of fertility, although not quite rapid enough to counteract the heavy drain made by over-tillage. The glacial soil is not a mere store-

house of plant food but a manufactory of it as well; and glacial soils are therefore strong and last for a long time.

THE BEGINNINGS OF MANUFACTURING.—A great agricultural industry, particularly one so varied and specialized as that of New York State, could not have developed unless a market were found for its products. The farmer may supply himself and family with food, and in a crude way may live and have the necessities of life even when entirely isolated; but he cannot go farther than this unless he is able to find some one who needs a part of his products and is willing to exchange for them something which the farmer himself needs. The pioneer settlers, of course, did not have this co-operation; but, just as now there are farmers living in portions of the Far West in practical independence of other people, so then the pioneers were dependent entirely upon their own energies and ingenuity to supply their pressing needs.

There are two natural means by which the products of the soil may be made of value in exchange, and fortunately New York possesses both of these, and the pioneers early developed them. If the natural facilities favor the development of other industries than agriculture, those engaged in these industries will need to be fed by the farmers. Or if people in more distant sections may be easily reached, the crops from the farms may be shipped away in exchange for other products.

From the very earliest settlement of the State other industries than farming have been in existence. At first there was trapping and hunting—a form of industry which supports but a limited population, and that of an unsettled kind, roaming about from place to place. The hunter and trapper is practically as independent of all other people as is the farmer in remote regions; but he, nevertheless, is able and willing to exchange products of the chase for the materials raised on the farm. While the trapper comes first in the settlement of the forested region, the wood-chopper usually succeeds him, sometimes destroying the timber for the purpose of clearing a patch of land for his crops, but often engaging in the business in an extensive way, clearing off the trees and removing the logs (Fig. 2). The lumberman, in a region of good soil, is naturally quickly succeeded by the farmer; so in the early days of the development of the State, after the trapper came the lumberman, and his occupation, not being a food-supplying one, demanded that he should be supplied with what he needed for food and clothing. As now, among the woods of Maine, little patches of meadow land, far away from the

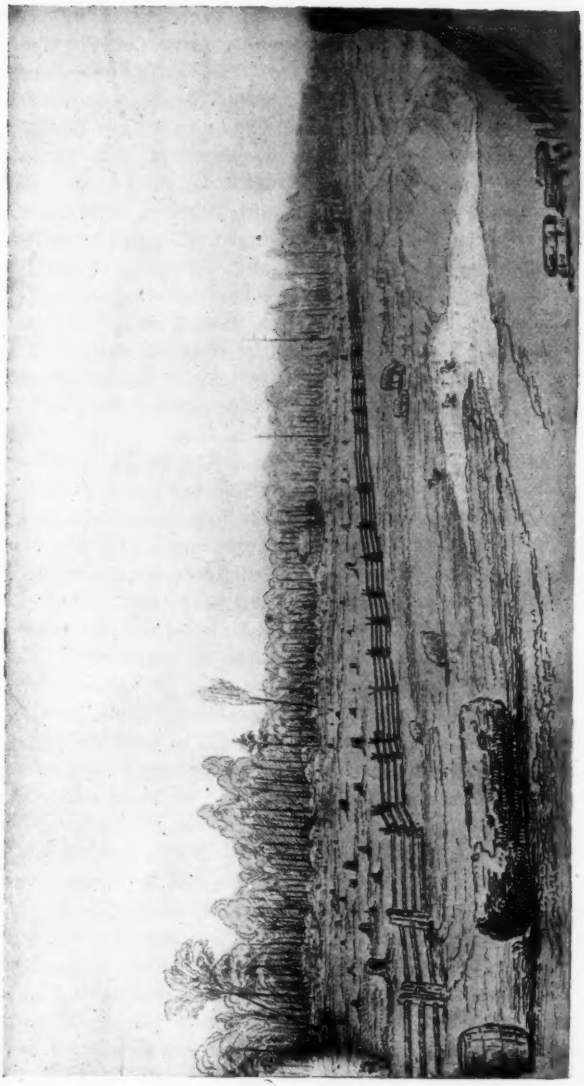

FIG. 2.—FIELD OF TREE STUMPS.

railways, supply their owners with an excellent living because of the crops of hay, potatoes, etc., which they produce for the lumbermen, so in the early days of New York history, one of the sources of profit to the pioneer farmer came from the demands that were made upon him by the lumbermen.

Timber-cutting means not merely the work of cutting the trees and floating the logs away, which would supply employment to but a limited number; it demands that there shall also be much work in preparing the lumber for market. As in the Adirondacks to-day, the lumber where it stands, or in that immediate neighborhood, is of very little value because of the absence of market, so while the forests in the agricultural part of the State were being stripped off, it was necessary not merely to cut the trees but to remove the lumber. As now in the Adirondacks, so then in the remainder of the State the removal of the forests was greatly facilitated by the waterways. Lumber could be floated down the streams and was removed in that way, and this fact has had a great influence upon the State, being of importance not merely because it served as a means for the removal of the forests, but also because it furnished one of the first great proofs of the importance of these waterways.

Therefore, early lumbering was an industry serving not only to employ the men immediately engaged in it—in cutting the trees, floating the logs and sawing them up—but also aiding agriculture partly by clearing off the forests which encumbered the land, and partly by furnishing some support to the growing industry of agriculture through demand for the farm products. It furthermore aided in the industrial development of the State by pointing out the usefulness of the waterways, whose later development has had such notable influence upon the prosperity of the entire State.

The necessity of making the rough logs into lumber and wooden articles, as barrels, laths, shingles, etc., caused the location of sawmills in various parts of the State. This work of transforming the rough lumber to various wooden articles was greatly facilitated by the numerous rapids and waterfalls scattered over the State as a result of the glacial accident which has turned so many streams from their courses and forced them, in choosing new courses, to tumble noisily along over the irregular rock layers. Most of these sawmills have now disappeared, and their water power has come to be utilized for other purposes, so that one travelling over the State at the present time would scarcely realize what an important step in the industrial development of the State this removal and manufacturing of lumber has been. It was the basis for the wealth

of many of the families of New York State. Turning their attention to the removal of the forests from the land, they developed a capacity for this form of business which, when the opportunity disappeared through the removal of the forests, was transferred to other regions, even though the man himself remained living where he first began his lumbering operations. Some of the lumbermen worked toward the Adirondacks, other saw still greater opportunities in the West, and much of the development of lumbering in the Michigan and Wisconsin region has depended upon the skill previously acquired in New York State. Now that these western forests are disappearing, one finds the Wisconsin lumbermen transferring their business interests to other fields, as, for instance, the South. One of the unique and important results of this ancient lumber industry is found in the location and development of Cornell University, which owes much of its financial endowment to the lumberman's skill.

Closely succeeding, and in many cases even accompanying the manufacturing which was associated with the removal of the forests, came the development of manufacturing associated with agriculture. And since agriculture has permanently succeeded lumbering, the grist-mills, which were the first of the manufacturing plants related to the agricultural industry, have maintained their hold and are still in operation along the hundreds of creeks which flow with torrential course down their post-glacial valleys.

The Later Development of Manufacturing.—Many other forms of manufacturing have developed as the State has become more settled. The grist-mills near the waterfalls of the Genesee at Rochester have developed greatly in importance, and the water-power is utilized for many other forms of manufacturing. The demand of the agriculturist for implements has led to the development of the immense Osborne plant at Auburn. Cheese factories and creameries have developed all over the State, and along the various water routes manufacturing towns engaged in many forms of industry have been established.

The debt that the manufacturing interests of New York State owe to the glacial accident can never be fully stated. The glacier left the country dotted with lakes; and it left many of the streams turned from their courses down slopes over which they flowed rapidly. For this reason, as in the case of New England, most parts of New York came into the possession of almost unlimited water-power. By itself, this might not have been developed as it has

been; but aided by the facilities for transportation, and by the increasing density of the agricultural population, the region has, as the result of natural causes, become not only a great agricultural district, but also one of the most important manufacturing regions in the country, with large towns and cities and their consequent multitudes of workers demanding products which the soil is easily made to furnish. With this development of the home market there came also a differentiation in agriculture, until, in addition to grain raising, there have developed the industries of fruit raising, dairying, sheep raising, truck farming and the other great agricultural interests for which the State is noted.

The State has not begun to realize all of its natural resources of water-power, the most impressive example of unused facilities being Niagara Falls, also a product of the glacial accident. This immense cataract, for a long time merely a great fall, to see which people journeyed from all countries, is now, like its less notable neighbors, which exist by thousands in the State, being made to take a share in the industrial progress of New York. This almost inexhaustible water-power is being put to use, though it seems almost desecration to fill the beautiful gorge, and line its banks, with great tubes and unsightly power-houses, and to transform the border of the cataract into a busy city with its throng of unsympathetic workers. This is, however, an age of progress in which the needs of mankind take precedence over sentiment; and Niagara is destined not merely to light and furnish the electric power for Buffalo, but also to run countless manufactories in its neighborhood. It promises to become the greatest source of power in the whole world, and to furnish industrially a marvellous illustration of the grandeur of nature's forces, as it has in the past filled the traveller with awe.

Mineral Resources.—The mineral resources of the State have not done much, as compared with many other States, to aid in the industrial development of the region. Aside from iron mined in a few places, certain building-stones found here and there, and a relatively small amount of petroleum,—the northern continuation of the Pennsylvania field,—the State has supplied little else of mineral origin excepting salt. This latter product, however, has been of marked importance. While at present it is producing so great an output that it employs many thousands of workers, and determines the position of a number of towns and villages, in the past it was even more important, although its output was vastly less extensive. The

salt springs at Syracuse, resorted to by the Indians, and used by them, became a centre of importance in the early days of pioneer travel; and later, when the settlers of the neighborhood needed salt, these springs led to the development of the industry which located one of the large cities of the State. Syracuse has passed the day when it was a great salt-producing city; but the seat of this early industry attained sufficient size to warrant its future development as a result of other industries.

The lack of coal would have been a much greater drawback to New York State had it not been for the presence of extensive deposits of this mineral not far away in the neighboring State. Very early this was transported into New York for manufacturing purposes, and across the State for use in more remote regions; and the coal-carrying trade of the early days was one of the important aids to the development of the great water routes of New York, and helped to determine some of the cities, as, for instance, Ithaca.

THE WATERWAYS.—A home and foreign market of the present size could not have been created in New York State had there been no natural facilities for the transportation of the products of manufacture. But with facilities for transportation, the agricultural industry of New York has far exceeded the demands of the immediate home market, and the products of the farm, as well as those of the factories, are sent far and wide. While at present man has in some respects risen considerably above the influence of his immediate environment, in the early days of the development of New York State the surroundings had an immense influence upon the conditions of life. In those days the time had not yet come when railways could penetrate into the remote, seemingly almost inaccessible, regions; natural pathways were followed, and among these the most potent have been the water routes.

The State is traversed by such a series of natural water highways that it has always been possible to travel by water over a large part of its area. Besides the two great lakes, Ontario and Erie—separated, to be sure, by the impassable Niagara Falls—there are Lake Chautauqua, the several Finger Lakes, Oneida Lake, Lake George, Lake Champlain, the St. Lawrence River, the Hudson, the Mohawk, the Susquehanna and the Allegheny, besides innumerable small lakes and rivers. Upon these the Indians travelled by canoe; and the early white pioneers followed the same means of entrance. Numerous falls and rapids required "carrys," and "carrys" were

often necessary across divides; but, nevertheless, it was possible to penetrate deeply into the New York wilderness. The importance of this ready access is illustrated with great clearness in the early history of the State; the Dutch settlements along the Hudson, and the pushing of the frontier line up the Mohawk, and out over the plains of north-central New York, and along the lake shores, tell of the influence of the waterways.

Since railways were not then thought of, as the development of the State continued beyond the primitive stage when canoeing sufficed, the demand for better means of entrance and exit from New York naturally led to the construction of canals. Owing to the large river valleys, and to the numerous lakes, a few canals opened up to larger boats a great expanse of country. Each of these has had an important influence upon the development of the State; but the great scheme for the improvement of the waterways of New York was the building of the long Erie canal. Nature invited this, and the wisdom of some of the early statesmen of New York led to the acceptance of the invitation.

The sinking of the land, or its "drowning," had admitted the ocean tide up the Hudson River beyond Albany. The glacial accident had transformed two streams, one flowing westward, one flowing eastward, into the east-flowing Mohawk, with a gentle slope from the divide near Rome, with one or two exceptions, all the way down to the Hudson. From Rome westward there stretched a plain greatly levelled by glacial erosion and deposit, and covered so deeply with drift that for a large part of the distance from the Hudson to Lockport, the digging of the canal required merely earth excavation and little rock work. The one great obstacle to the construction of the canal was the escarpment at Lockport, to surmount which considerable ingenuity was required; but, after reaching the crest of the upper plain, the remainder of the route to Buffalo was simple. This opened up communication not only across the entire State, but to the then unsettled and unknown West. Short side canals connected the Erie canal with Lake Erie and the Finger Lakes, and these in turn were but a short distance from the Susquehanna.

No one can ever estimate the importance of this canal system in the development of the City of New York and the State as a whole. The direct benefits, when it was the only means of transportation of materials, are well understood. The indirect influence, in leading to the construction of railways, is, perhaps, not so widely appreciated. There are many who believe that the usefulness of this

canal system is of the past; that the present day has outgrown the conditions of canal boating. Doubtless they are correct in so far as canals of the small Erie type are concerned; but no one who has thoughtfully considered the influence of the Erie canal on the past can have any question as to the future value of an enlarged Erie canal, which shall admit the ships of the lakes and furnish a free passageway across the State. There are always those who question the value of large expenditures; there were such objectors at the time of the proposition of the Erie canal itself; and there are even now those who question the wisdom of spending large sums in further improvements; but fortunately it is a characteristic of our race that objectors of this kind are always in the minority.

A combination of physiographic causes has conspired to make New York City a great commercial centre. The aid of man in the construction of canals, and later of railways, has determined that it shall be the greatest commercial centre of the nation, and doubtless, in the not very distant future, of the entire world. It stands at one of the gateways into the interior of the continent, the other two being the St. Lawrence and the Mississippi. The mouth of the latter is too far south, and the most productive part of the country is too distant and too difficult to reach. The St. Lawrence, with its great city of Montreal, furnishes another natural gateway into the continent; but it is frozen for months, and, owing to the fact that the international boundary practically prohibits its use as an exit for the products of the northern United States, it leads into a much less productive section than the Hudson gate. The latter reaches back into the most productive portion of the American continent. Railways now centre toward the splendid harbor at the end of the Hudson estuary, and ships that pass down the Hudson, and the canal boats that travel from the West, are headed toward this great shipping point. It is needed now to make water connection more easily possible.

This is but a general statement of some of the more salient features upon which the development of the State as a whole has depended, a mere hint as to the direction in which it would be easily possible to extend the discussion if we were to commence upon further detail.

It might readily be shown why some parts have become the seats of the dairy industry; others of grain production; others still of vineyards, orchards, etc., either because of features of climate or soil or physiography; and it might also be shown that some portions have remained nearly unsettled, and are destined to remain

so in the future because of distinctly unfavorable conditions. Moreover, there is scarcely a town whose origin and development have not been profoundly influenced by the surroundings. In some it is water-power and manufacturing; in others, agriculture, or the outlet of a canal, or the discovery of iron, salt, oil, or other mineral products, etc. We could also dwell upon the influence of physiography upon those great aids to commercial development, the railways, and study in detail how closely they have been obliged to follow natural routes. One gains an impressive lesson in this connection when he attempts to travel by rail from central New York to western Pennsylvania.

FIG. 3.—EARLY BUFFALO.

How Buffalo has grown as New York City has developed, because goods bound to or from New York City have needed to have their mode of transport changed from rail or canal boat to lake boat, or *vice versa!* What a chain of important cities there is along the natural water route and its improved extension, the Erie Canal! This is no mere matter of chance; nature provided for it and man merely accepted the conditions, adapted himself to them, and improved upon them where slight improvement promised great reward.

This point of the dependence of industrial development upon the natural conditions is one to which especial attention needs to be called in these days when man so easily overcomes obstacles, causing railways to ascend to the mountain passes or to plunge directly through the mountain. Now, man is in part the master of his surroundings; but even at present he is not fully free from their influence, and the time was when the environment, more than any other single cause, directed his movements and guided his progress. We ought not to be allowed to forget this.

THE FIVE CIVILIZED TRIBES: INDIAN TERRITORY.

BY

C. H. FITCH.

With the exception of a small area in the northeastern corner, belonging to several small tribes of Indians, Indian Territory comprises the lands of the Cherokees, Creeks, Seminoles, Choctaws and Chickasaws, five tribes, known as the Five Civilized Tribes, and to these tribes, just on the eve of important changes in their tribal governments, consideration is here given. Their lands were deeded to them upwards of seventy years ago, when the need of more room for the settlers in the South made their removal from the Southern States desirable. Then the country adjoining Arkansas on the west seemed a good place to send them, and at that time it was considered so remote from white settlements that, in all probability, no thought was given to the possibility of disturbing them again. It was intended to settle them there for all time, where they could live to themselves, according to their own pleasure, with self-government, under the protection of the general Government. They were thought to be sufficiently advanced in civilization to be able to continue the improvement already begun, but the results show that this belief was unfounded, as far as the full-blooded Indian is concerned, since he is to-day no further advanced in civilization than before.

Indian Territory is a beautiful country, particularly during the spring of the year, when the warm sun and frequent showers have produced a most luxuriant covering of grass over all the hills and valleys. The great profusion and variety of wild flowers and the fresh green of the oak forests, just putting out their leaves, adds to the beauty and richness of coloring; and the homeseeker, in passing, is tempted to leave his train to investigate the possibility of securing a farm there, even if he is obliged to rent it instead of buying the land. Later in the season, when all is dry, and the weather warm, the country presents a different appearance, not so attractive, but with occasional showers at longer intervals the crops of cotton and grain mature without great effort. In fact, it seems to be an easy matter to gain a livelihood in Indian Territory; indeed, it is easier to raise cotton than to pick it, for it often remains in the field unpicked when the time for planting comes again.

The Spanish explorer, Coronado, saw this country over three hundred years ago, and the secretary of his expedition describes

it as more beautiful than any country that he had ever visited, either in America or Europe, and it must have appeared to the Spaniards a remarkable contrast to the dry and arid regions lying to the west, through which they came on their journey from Mexico.

The spurs of the Ozark Mountains, extending into the Territory, are quite high and rugged, and form deep gorges or cañons, through which mountain streams of good water flow all the year. The larger streams of this character are the Grand, Illinois, and Kiamichi Rivers. They are picturesque and wild in their surroundings, and the heavy forest growth of pine, cedar and oak affords most excellent shelter for the wild animals, which are so abundant as to make this one of the best game regions in the country.

Quail are numerous everywhere, and on the open ground prairie chickens are still found. The water-ways in the fall and winter furnish the sportsmen an opportunity of shooting many varieties of ducks, and all the year are full of fish. But in the mountains and woods wild turkeys, squirrels, deer, bear and cougars are to be found in great numbers, although no effort has been made to preserve the game, and the neighboring States supply hunters in hordes in the winter months.

The Arkansas, Canadian and Red rivers, and most of the other streams not in the hill country of the Indian Territory, are the characteristic rivers of the semi-arid west, broad and shallow and often dry, flowing through wide valleys, subject to sudden overflow in rainy seasons and doing much damage to farms and improvements. When the waters recede, the river may be found in a new channel, as, for instance, when the Canadian River flooded the country in 1898, and washed away long sections of the track of the Missouri, Kansas and Texas Railroad, a new channel was formed over two miles from the old one, where the iron bridge still remained, but without a river beneath it. To avoid the expense of a new bridge, which might again be deserted by the river in another year, the company succeeded in obtaining permission, by Act of Congress, to turn the river back by a canal to the old river bed.

The Indians knew something of the country that was to be their new home, for their young men had gone out to it in previous years on hunting expeditions and found it teeming with buffalo, deer, turkey and other game. There was plenty of timber for fuel and to build their log cabins, and an abundance of grass for their horses and acorns to fatten their hogs. Much of the land was rich and

cultivable, but they had no desire to till the soil for anything more than a little corn for food, but not to sell. There was some dissatisfaction at first about leaving their old homes, but about 1835 nearly all had reached their new possessions and soon were quite contented. The lands were deeded by the United States to the several tribes or Nations, not in severalty, however, but to each Nation its own parcel. The United States having conveyed the title in the lands to the Indians, they were secure, as they thought, forever. Indian lands usually are reservations set apart for the use of Indians during the pleasure of Congress, but in this instance the lands were deeded to them, and the Government of the United States agreed to protect them and keep out all intruders.

The present possessions of the five tribes contain an area of about 30,000 square miles and are a part of their original holdings, they having sold off from time to time large bodies of land now included in Oklahoma Territory. Large sums of money have been paid and divided among them, and in some instances a part or all of the purchase money has been held for them in the Treasury of the United States and the interest paid annually. They have ample school funds and have built large and substantial buildings for seminaries and boarding schools. They have also their public buildings, erected out of money thus paid to them. Various missions also provide educational facilities for Indians, but there are no schools for white children. The full-blood Indians have from the first sought the seclusion afforded them in the mountainous and timbered regions of the east half of the Territory and they have never mingled with the whites or in any way advanced their condition by education and civilization.

There are no "blanket" Indians in Indian Territory; all, even the full-bloods living in the most remote sections, dress in civilized fashion. Their native fondness for bright colors is shown principally by the women in their brilliant-hued calico dresses, neck handkerchiefs and shawls. They are fond of games, principally Indian ball, and cling to many of their original customs. Their game of ball is interesting and exciting, being somewhat similar to football, and quite as rough and dangerous. The ball is very small, not as large as a tennis ball, but it is not handled with the hands or kicked with the feet. Instead each player is provided with two sticks of hickory, with small cup-shaped ends, whereby the player deftly picks up the ball from the ground and runs with it, or endeavors to throw it to the goal. When the game is indulged in by opposing teams of different counties or Nations the greatest interest is shown and large crowds congregate to witness it.

Those of the Indian citizens who have a mingling of white blood, and the white men who by marriage have the rights of Indians, have enjoyed to the fullest extent the advantages given them to hold and occupy lands for farms, and immense pastures have been fenced for their cattle, the grazing of which is a large and prosperous business in the Territory.

Early on their arrival in the Territory the several Nations proceeded to organize and form their governments, each tribe or Nation being entirely independent of the others. They elected officials, executive, legislative and judicial, and proceeded to enact laws and enforce them. Under their system the lands were free to all Indian citizens for as many acres as they wished and for as long as they cared to possess them. They took with them negro slaves and held them as such until after the Civil War, and for this reason it was natural that the Indians should have sympathized with the slave-holding States when the war came, and that they should have furnished men for the Confederacy. After the war the Indians were forced to recognize the right of each slave to forty acres of land whenever in the future the lands should be divided. The popular belief prevailing at that time among the negroes of the South, that they were each to be given forty acres and a mule, came from this provision of land for the Indian Territory slaves. The Indians were not disposed to do much cultivating of the soil, preferring to eke out an existence by hunting and fishing, only raising small quantities of food. Later white men, seeing the advantages of soil and climate, obtained a foothold through leases from individual Indians, and by paying tribute secured permits from the Indian Governments. The Indians have claimed that the United States failed to fulfil its promise to keep out intruders—and certain it is that they have not been kept out; but it is contended that the Indians invited them there for the purpose of increasing their revenues. Under this system the country soon contained more whites, or non-citizens, than Indian citizens. In speaking of the Indians, all so-called citizens are included, many of them having merely a trace of Indian blood. Farms were cultivated, pasture lands fenced and coal mines developed. Still, it might be called an undeveloped country. Those engaged in these pursuits had no real title to lands, and their improvements, as a rule, were such as would naturally be made by temporary occupants, although there are substantial and costly buildings in some of the towns.

The country has been sometimes terrorized by desperadoes and train robbers, but, as a rule, these rough characters came from the

neighboring States and Territories, and generally the country is peaceful and not nearly as bad as painted. Every "gang," like the Daltons, was sooner or later run to earth and captured or killed, and in such a short time that of late years there has not been much encouragement to engage in the "road agent" business.

Under the necessity for railroad communication between Texas and the North, the first railroad was started across Indian Territory south from the Kansas line about the year 1875. A charter was granted across the Territory by Congress to the first railroad which should enter it from the north. The railroad company which expected to avail itself of the charter was somewhat slow in starting to build, and another road, which afterwards became the Missouri, Kansas and Texas Railway, saw the opportunity and seized it, building night and day on the prairie, laying tracks without preliminary grading until after they had crossed the line and earned the right to continue through. Now there are several lines across from north to south and from east to west. The advent of the railroads caused the development of the coal mines and numerous towns to spring up along their lines. The mines are operated under leases and pay royalty to individual claimants and to the Indian Governments. Traders and tradesmen, farmers, mechanics and professional men pay for their permits, and thus the Indian Governments are enabled to pay their expenses. The Indians were quite satisfied with the conditions, they having the best of it, and all the right on their side. The intruders, or non-citizens, were not satisfied, however; they wanted more rights and privileges. They wanted schools for their children, town organizations, police and fire protection, improvements of roads and streets, and other things that go with progress and development in a new country. The Indians contended that they had no right to be there and that if they remained they should accept the conditions as they found them. In this age, however, it is impossible to keep the average American out of any place where, in his estimation, he can by energy and pluck add to his capital in developing the resources of a country. The situation was somewhat analogous to that in South Africa to-day. There were at least five "intruders" for every Indian citizen. It was almost an impossibility to put them out; they were there, and to stay, and they wanted a better chance to live and enjoy the country, and a government with white representation. That a change must come was apparent to the most enlightened of the Indians. In each Nation there are two political parties—one representing the full blood element, bitterly opposed to any change,

and the other the progressive element, recognizing that the prevailing conditions could not last much longer and that a change was inevitable. There has been and there still is strong feeling on both sides. In each party there are men of force, ability and intelligence, but of late years the latter party seems to be gaining in strength.

A number of years ago a commission was appointed, under authority of Congress, commonly referred to as the Dawes Commission, to treat with these five tribes, and endeavor, if possible, to arrive at some solution of the problem which would be acceptable to the Indians and to Congress. At first the Commission met with a very cold reception, the Indians refusing to hear of any proposition involving any sort of a change in their tribal relations, but gradually, after years of patient waiting, they have finally listened, and, in some instances, have concluded agreements satisfactory alike to the Government and a majority of the Indians. The Act of Congress, known as the Curtis bill, which became a law during the last session of Congress, provides for allotment of the lands in severalty and for the survey and disposal of town sites, adjustment of leases of mineral lands, and also abrogates the tribal courts. Within the next few years an entire change of affairs in the Territory will take place, the Indians will take their lands in severalty and dispose of the town sites, so that the towns and their organizations will be largely owned aud controlled by white men now classed as intruders. By some system, probably by leases, all of the cultivable land will gradually become improved and settled upon. Good farms now exist, generally under the lease system heretofore mentioned or held by individual Indian citizens of white blood. Many holdings will be reduced in size, but the aggregate number of acres cultivated will be increased many times, and the Territory will soon take its place as a productive agricultural country, sending to market vegetables, fruit, grain and cotton; also wool, mutton and beef from the pasture lands; an increased output of coal will find ready sale near at hand, the asphalt lands of the Chickasaw Nation will be developed, and, in all probability, petroleum and natural gas will be discovered to add to the riches of this already rich country. Pine lumber, pencil cedar, walnut logs and oak ties will become more abundant as articles of commerce. The lands have been surveyed into townships and sections, which is the first step in making the allotment; but it will take several years to segregate the town sites, adjust the leases of mineral land, and appraise the balance, and to make an equal division among the

representatives of the several tribes. To satisfy all and to make a fair apportionment of the land, which ranges from the rich, alluvial soil along the rivers to the almost valueless, stony, barren hillsides, will be a difficult task, but the sooner it is accomplished the better for all concerned. Until the division of the lands is an accomplished fact progress in the development of the country will be much retarded. The impending change is realized, and it causes an uncertainty and unsettled condition that must continue until a new order of things assumes some definite shape. We cannot blame the Indians for their desire to cling to the old order of affairs; taking their point of view it is hard to give up control of a country that has so long been theirs. They realize that they will be outnumbered and soon lost sight of in the government of the Territory, and that where they have been of the greatest importance they will have no voice in the management of a new organization. There is no help for it, however, and no advantage will be gained by longer striving to put off what appears to them an evil hour. It is inevitable and must be apparent to all of them by this time, although it has come upon them in a gradual way. It is to be hoped that the full-blooded Indian will be benefited by the change, and that by the necessary mingling with the whites his education and condition will be improved. He should be given his land to hold and not be permitted to sell, at least for a long term of years, so that in time he may be able to know and understand the value of his home. The white, or nearly white, citizens will be able to take care of themselves in any environment, and are quite as capable of so doing as any class of people they may be brought in contact with. But the real Indians will need all the protection that can be given them, for they are totally unable to take care of their own interests. They are located in the woods and sterile lands in out-of-the-way places, and, in all probability, will prefer to keep to themselves as much as possible; but if they could be induced to come out of their seclusion and take fertile lands, they might, in time, with encouragement, become good citizens and as good farmers as their neighbors. After all they are the ones needing the most sympathy, and as there are but few of them, it would seem possible to aid and protect them in the final distribution of the lands and moneys and by the enactment of laws, looking to a proper and careful administration of their affairs. They should be treated as minor heirs in the division of a great estate, and allowed every consideration favoring their immaturity, but impelling and encouraging their development.

PALESTINE AS ILLUSTRATING GEOLOGICAL AND GEOGRAPHICAL CONTROLS.*

BY

REGINALD A. DALY,
Harvard University.

THE SCENERY.—We have seen that most of the historic hills of Palestine bear to the plateaux the same relation as that of the finished cameo to the flat surface of a still uncut plate of onyx, agate or shell. They have been etched out by rivers, by the erosive power of rain, and by the freighting of waste down the wadies to lower ground. Thus, the tourist on Tabor, Little Hermon, Ebal, Gerizim or Gilead will not only look down into the Ghôr; he has also unimpeded views toward every other point of the compass, across valleys of erosion which encircle the hills. Mt. Ebal, where the six tribes of Israel pronounced the curse on disobedience, is sundered from Gerizim, on which the other six tribes chanted a blessing on obedience, by just such a wady, narrow and deep, across which the voice of a single person carries well. Others of the hills are, in a sense, very comparable to the buttes that stand up on our western plains, and bear witness to well-advanced destruction of the surrounding parts of the plateau.

It remains for us to note the conditions which have produced the scenic details of the plateaux. Great Lebanon and Hermon may be taken as types. From the foot to the summit of each of these nine thousand-foot "mountains" is as great a climb as that from the plains to the top of most of the peaks in the North American Cordilleras. Expecting much of scenic beauty from massifs of so great altitudes, the average tourist is disappointed in these two; yet this very disappointment is of value if it be accompanied by the conviction that the American Rocky Mountains or Swiss Alps on the one hand, and the Syrian uplands on the other, furnish two entirely different kinds of landscape. It is not the general difference of vegetation, the contrast of the bare Palestinian scarps and the wooded slopes of the Rockies; for he would find on the treeless spurs of the Caucasus even more grandeur and wild confusion than

* Continued from Vol. XXXI, page 458.

in many justly famous American mountains. In the Lebanons there is less of grace and serrate irregularity than in the Rockies or in the Alps; more of massiveness, simplicity and strength. The contrast is striking; the cause definite, and not far to seek. Either in the Alps or in Lebanon the rocks are of differing hardness, and they will resist erosion in quite different proportion. Where, as in Lebanon, the strata, for the most part, lie nearly horizontal, the process of wear will produce horizontal lines on the edges of the beds, and vertical lines in the profiles of the retreating cliffs; but the folded, contorted and otherwise deformed strata of the Alps will so yield to the destructive activities of meteoric waters that the fretted edges of the layers will run in all directions in plan and stand at all angles, from vertical to horizontal. There results, in the one case, the scenery of a true plateau, albeit the "glory of Lebanon," in the other that of a typical vigorous *mountain;* the sculpture of a Colorado cañon is possible to the one, the fashioning of an Inn Valley to the other.

THE CLIMATE.—It would be quite out of place to describe here the ultimate causes of the Palestinian climate, even should they all be known. Some of the proximate causes may, however, be noted.

The complex phenomena which make up climate are conveniently grouped about the seasons; in Palestine these number but two, and throughout the Biblical writings only two are mentioned. There is no real spring and autumn in our western sense, for the warmth and dryness of summer has pretty definite limits in the coolness and wet of winter. They are the familiar "dry" and "wet" seasons of many a tropical and sub-tropical land. To this day the beginning of the rainy season occurs usually in late October, as the "early" or "former" rain, all-important to the husbandman as a condition of his ploughing and planting his crops in the ground baked during the hot months of summer. Following a period of drier weather, the heavy rains begin again and continue at intervals until March. Then comes the question whether the precipitation shall last into April, inasmuch as upon this "latter" rain depends the full rounding of the ear and final ripening of the barley, and later of the wheat, for the two chief harvests of Palestine. Full of meaning was this climatic feature of the land of promise: "I will give you the rain of your land in due season, the first rain and the latter rain, that thou mayest gather in thy corn and thy wine and thine oil."

On the other hand, so rare is rain in time of actual harvest

that it was even made the basis of Elijah's miracle in calling upon the Lord, who sent a thunderstorm over the land at time of wheat-harvest.

This trenchant distinction between the seasons as regards precipitation, is, in a large way, not difficult to explain, though too little is known of the meteorology of Palestine to permit of our going into details. In brief, rainfall is a function of wind-direction and of the thermal conditions of the land-surface.

The common winds of summer are those from the north and northwest, which cool the land and go far to account for the salubrity of the country. Like them, the usual afternoon sea-breeze is a "drying" wind, since all these winds are warming up as they pass over the limestone hills and are ready to absorb still more moisture instead of giving it out by condensation. Likewise in summer, for many days at a time, it may be, the wind blows from the east or the southeast, representing the Scriptural "east" wind, the influence of which is typified in its blasting the seven lean ears of Pharaoh's dream. The south wind, "which bringeth heat," is also of the nature of a true sirocco, a hot wind from the desert, laden with desert dust and incapable of furnishing moisture to the plateaux of Palestine.

In their physiological effects the east and southeast winds quite change character as the winter comes on; they become stimulating and bracing. They behave, however, like the cutting and disagreeable north wind in preserving a dry condition. It is the westerly, chiefly the northwest and west, winds that give out the rains of winter. Relatively moist from their long journey over the Mediterranean, they precipitate their load on coming in contact with the cooled surfaces of the coastal plain and plateau, which radiate rapidly the heat derived from a winter sun. Although the average annual rainfall of the plateau is only half that of Boston, Massachusetts, yet this amount of precipitation represents most of that which is afforded by the moisture-bearing wind. By the time it has passed the edge of the escarpment overlooking the Ghôr it is already greatly dried; the sponge has been squeezed. Moreover, this same wind, on descending into the graben, is compressed, thereby warmed and hence endowed with the capacity for more water-vapor. For these reasons, the Ghôr must be content with a rainfall that keeps it, for the most part, in the condition of a typical desert, of a climatic belt remarkably distinct from that of the western plateau. As we might expect, the average annual temperature is much higher (6° C.) than at Jerusalem, and the scanty

flora and fauna of the graben about the Dead Sea are tropical, being allied to those of Egypt and of Hindostan. Impoverished as it is, the westerly wind is yet able to supply the eastern plateau with a certain amount of rainfall, though far less than the more favored slope of the Mediterranean side. The climate of the two plateaux is otherwise somewhat similar, and the orchards and farms of Philistia and of Judæa correspond to the grainfields of Moab.

In these general relationships exists the well-established parallel between the climates of Palestine and of California. For the climatologist, the Coast Range is equivalent to the Judæan Plateau, the Great Valley to the Ghôr, and the Sierra Nevada to the range of Moab. The two countries lie in the horse-latitudes; each has a single cloud-breeding reservoir on the west. The summation of so many similar conditions gives in each land two seasons, an "early" and a "latter" rain, a perennial afternoon sea-breeze, a tendency to the development of "northers," a marked salubrity of climate on the western uplands, a less fertile eastern upland and an intermediate desert lowland.

PHYSIOGRAPHIC CONTROLS.—It has been shown that the topography of Palestine may be explained by reference to a series of geological changes, and that its climate likewise depends, in large part, on the topography and geology. Finally, it may be noted that climate and topography have governed the habitability of Palestine, the industries of its varied inhabitants, and their history—military, political and ethnographic. A convenient phrase has been invented to express the sum of natural conditions which determine in any region the activities of man in the region. These conditions are called "physiographic controls." But little has been done toward developing the doctrine in its detailed application; yet it is to be accounted one of the chief aims of geography, for, not until it be so developed is a thoroughly scientific, political and commercial geography possible. The following paragraphs are intended rather to illustrate the principle of controls than to sketch all the phases of the subject.

The rocks of Palestine, practically without exception, belong to varieties which are competent to furnish good soils, provided there be sufficient rainfall; hence the four zones of rainfall are also well-marked zones of fertility. The richest of all, the Sharon-Philistia plain, corresponds to the coastal plain of alluvium; the next most fertile belt is the western plateau; the eastern plateau has a rather

less-favored vegetation, that soon fades out in the vast desert of extra-Moabite territory in the east. As it is alluvial ground, we should expect the valley of the Jordan to produce heavier crops than the plateau; yet, for reasons already noted, it is a barren plain, except where springs supply water enough to show such capabilities as in the oasis of Jericho. The scantiness of population in the valley is at first sight inexplicable, for the most primitive sort of irrigation would afford abundant harvests. The fact is probably due to the unhealthy nature of the low ground; the few people who do live in the valley are described as feeble in comparison with the other inhabitants of Palestine. The uplands, on the other hand, are very salubrious; Jerusalem, twenty-six hundred feet above the sea, is fever-stricken for quite local causes.

Hand in hand with the food question, is the problem of water-supply. It is only within a few decades, and with the growth of the great cities in Europe and America, that to the people of the more fortunate Western lands, this question has become of real economic importance, *i. e.*, one of supply and demand, which results in actual payment for drinking-water. But in Palestine it was, and is an ever-present question, the occasion for tribal and family ventures, in which the stakes were human lives and the possession of the living waters. We have seen why this should be so: a scant rainfall and the disappearance into subterranean courses of a large proportion of the rain-water, falling on the permeable limestones, have worked together to make the springs and oases the coveted source of wealth for all generations. From Genesis to Revelation, the rejoicing in the beneficial showers and perennial brooks and "fountains" has characterized many of the finest and poetic passages of drama, chronicle or psalm. In rainless Egypt, and Sinai, the people of Israel cherished the promise of their leaders, "For the Lord thy God bringeth thee into a good land, a land of brooks of water, of fountains, and depths that spring out of the valleys and hills." As the light of hope breaks through the wild despair of Zechariah, to whom came the vision of a reconstructed kingdom, he exclaims not only that "at evening time there shall be light," but adds the triumphant note, "It shall be in that day, that living waters shall go out from Jerusalem."

The student of the Hebrew literature cannot be fully sympathetic with his subject unless he visualizes clearly the physical conditions of a perennial water-supply; neither will he appreciate the significance of the numerous references to wells, cisterns and reservoirs or "pools." For that time and country the digging of the

wells of Beersheba by Abraham was like the founding of the great sea port and capital city by Peter the Great, or like the razing of the Bastille—an event of peculiar national importance. The Philistines saw the advantage of holding the larger wells during their military operations; at Bethlehem they caused even David himself to suffer from the thirst which he was too magnanimous to allay at the risk of the "three mighty men of valour." It will be remembered that, when Moses sent messengers to the king of Edom asking for permission to pass through his country, it was expressly stipulated that the people of Israel would not drink of the Edomite wells, so precious was the store of water!

Not only is rainfall a dominant condition of the varying fertility, salubrity and water-supply of Palestine; it explains in a general way the everyday callings of the present mixed population as it did the similar occupations of early Israel and of the Phœnicians. Sheep-raising has always been the staple industry of Trans-Jordan and of southern Judæa, and it plays a part in the life of the western plateau. It is almost a truism that the shepherd's life is a nomadic life, especially in a region of widely-separated oases and pasturages. For this reason, the patriarch in tents, with his family around him in tents, has persisted in this land from the dawn of history to the present day. Such a life is not a busy one, and the early employment of slaves made it still less absorbing for the stately heads of these migrant tribes. Thence came, as Renan points out, abundant leisure for introspective thought, for reflection on the problems of life. It can hardly be doubted that the many long centuries of nomadic existence had a capital influence in bringing to fruition the unique genius of the Hebrews for the development of moral and religious truth. Renan further shows that such a life forbade the maintenance of temples and of an elaborate worship of idols; that it was therefore easy for the monotheistic idea to take root; that both Judaism and Moslemism originated under these same conditions; and thence that the patriarchal idea may be regarded as "the corner-stone of religious history." *

The influences of the patriarchal life persisted long after the Israelites had entered the Promised Land. Then their history underwent a complete change, due once more to a physical necessity. Kept from the sea by the doughty Philistine, who, by his energy, resources and superior methods of fighting in the open country, kept at bay the restless Hebrew, the men of Israel never

* Compare the views of Dr. G. A. Smith in his masterly treatise on "The Historical Geography of the Holy Land" (1894).

attained a maritime spirit. Neither did they use the easily-acquired mineral wealth of the Ghôr, since there was little demand for its peculiar products; nor did they mine the immense iron and coal beds of Lebanon. The relatively great fertility of the plateau entailed, however, the possibility of a more comfortable existence, that of the farmer, and his settled abode was taken, for protection, around the numerous towns, which controlled, in addition, the simple manufactures of the times.

Sedentary from this time forth, this people became more and more diversified into distinct tribes, which gained their individuality on account of the varied character of the plateaux. Separated by the deep wadies, by fault-scarp or desert-plain, the tribes gradually differentiated during the centuries, much as the canton-folks of Switzerland are now contrasted with one another. Dialects arose, which it is fair to suppose were non-existent at the time of colonization; jealousies appeared between the nomads and the men of agriculture; many times civil war broke out among the blood relations; and thus we find Jephthah, the Gadite of Mt. Gilead, putting to death Ephraimites from the other side of the graben when he found that they could not pronounce his famous sibilant, and thus revealed their "foreign" extraction.

The influence of the Ghôr in preventing the easy mixture of peoples which were originally of common ancestry, and in bringing about their differentiation, had already been felt in the history of Palestine, for just before the crossing of the Jordan by Israel, the Amorites of the western plateau, once of one blood with the Moabites, had so far forgotten the family tradition that they marched against Moab as against a stranger and conquered the land. On a far larger scale, this mighty barrier kept alive the age-long animosities of the Israelites towards the Moabites, Ammonites and Edomites of the eastern plateau, whose customs, religions and languages had greatly diverged from their own. It is fair to suppose that, had all this country been plain, no such striking differentiation could have taken place, nor an occasion for the refrain, "Edom shall be a possession; Seir also shall be a possession, which were his enemies."

The strategic importance of topography in the Palestinian wars would furnish the subject of a fascinating chapter in the history of that country. The success of foreign arms in the land is not to be attributed to any lack of valor among the Jews, nor to the absence of means for ready defence; it was rather due to the incoherence of the tribes, which, if they had been united under the control of a

single centralized military rule, could very probably have repelled invasion simply by making use of the magnificent natural ramparts of the land. The brave Maccabeans and the energetic Josephus understood their opportunity when they respectively faced the disciplined armies of the Great Antiochus and the legions of Titus. The battles of the three passes and the tragedy of Masada are strong illustrations of the close dependence of national defence on topography. So Barak's army waited for the Syrians on the dome of Tabor, Josephus fortified it, and Napoleon's generals used it as a a point of vantage whence they drove the countless Bedouins of 1799 into the marshes of Kishon. To this day the numerous Druzes and Maronites of Lebanon, comparatively safe within their stronghold, have successfully preserved their individuality and religion in the face of Turkish aggression.

It has forcibly struck almost all modern writers on Palestine that its topographic relationships have governed the course of history in an important way quite different from that of influencing the development of the Jewish race, with its religion and its peculiar tribal attributes. A cosmopolitan interest attaches to its position as a long, narrow strip at the extreme end of the great water-way of the ancient civilised world, the Mediterranean, and between the two world-granaries of former days, the Tigris-Euphrates valley and the Nile valley. To the east are the deserts of Syria and Arabia—the most effective of barriers to the advance of armies bent on conquest. These must, then, in passing between Africa and Asia for land operations, use the natural pathway of a fruitful, water-bearing route that the coastal plain and western plateau of Palestine alone supply. Hence this little country has witnessed the march of Egyptian, Babylonian, Assyrian, Persian, Greek, Roman and Turkish troops, led forth to conquer the rich plains of Babylon, of Nineveh or of the Pharaohs, or to secure the only gate opening into the land-route to Persia and India on the one hand and Europe on the other. Alexander the Great opened the door and was successful in keeping it open until he had completed his scheme of world-dominion; Napoleon essayed to reach India by the plain of Esdraelon, Damascus and Persia, but was repulsed by Englishmen at Acre.

Partly because of the shifting of political centres of gravity, partly because of the discovery of other routes, partly because of the use of steamships and of the Suez Canal, Palestine has lost its once commanding position as a military gateway between east and west. The commerce of the Syrian ports has, for similar reasons,

faded into insignificance. For many centuries they had interchanged the goods of the world, not because they possessed good harbors—they are, in fact, among the poorest on the Mediterranean—but because this strip of shore lay near the junction of three continents, the surplus products of which must needs pass that way. Yet, were the political and natural conditions of twenty centuries ago to return, commerce would once more thrive in Tyre and Sidon.

The chief object of the foregoing sketch shall have been met, if the reader recognizes that the geographical facts concerning Palestine form a single great system; that the relief, drainage, climate and resources of that land are all, directly or indirectly, the effects of the geological history, and together, the causal conditions of human life, industry and history within the borders of southern Syria; and that the old Eocene sea-bottom possessed potentialities which had, so to speak, as their logical consequences, the development of a Levant, the existence of a Jordan River, the rise of that marvellous Jewish race, the brilliance of a long-continued Phœnician civilization, the Crusading romance, a Napoleonic campaign and the massacres of the Christian Maronites of a later day. In particular, I would emphasize how excellently well Palestine illustrates the influence of barriers on animal and plant life and on the human inhabitants. Orographic barriers are represented in grabens, fault-blocks, fault-scarps and erosion-scarps; climatic barriers in the wide wastes of desert land in Syria, Arabia and Sinai. We have noted that it was impossible for men to occupy the separate basins, valleys and plateaux without becoming characterized by tribal peculiarities, and hence that a uniformity of population as among the Indians of the Mississippi Valley or of the plains of Paraguay, or among the governments of Great Russia, is here neither expected in theory nor discovered in fact.

The climate has conditioned the nomadic life, and with it the peculiar strength of family life and of the principle of obedience; and has undoubtedly had an important influence in moulding the moral and religious ideas of the Hebrew people. It is, of course, not intended to minimize the difficulty of allowing for the innate, and, as yet, unexplained springs of conduct which were the inheritance of the races of Palestine before they entered the country. Free volition and a particularly enterprising nature must have played a large part in the formation of Phœnician commerce, since the smooth-flowing outline of the Levantine coast-line is, in truth, more a discouragement than an incentive to navigation. Yet we

have seen that, even in this case, there is some good physiographic explanation of the phenomenon.

Finally, a preliminary review of Palestinian physiography from this genetic point of view may be commended to the student of the Old and New Testaments; to narrative and literature it lends a vividness and a concreteness which cannot fail to stimulate both the memory and the appreciative faculty.

A DICTIONARY OF TOPOGRAPHIC FORMS.

BY

HERBERT M. WILSON,
U. S. Geological Survey.

The following list of definitions is intended to include all those terms employed popularly or technically in the United States to designate the component parts of the surface of the earth. So far as practicable, the endeavor has been to refrain from defining such words or using such definitions as refer merely to the origin of the various topographic forms. At the same time it has been found necessary in a few instances to define forms according to their variety of origin, as those resulting from volcanic or glacial action. In the case of names which are locally peculiar to a limited portion of the country, the effort has been to indicate the regions in which they were employed. The language whence derived is denoted by Sp. for Spanish, Fr. for French, etc.; the word "origin" following indicates that it has been generally adopted in American nomenclature.

The manner of spelling *canyon*, *amphitheater*, etc., herein adopted, accords with the usage of official government publications. The writer has not hesitated to extend or restrict the meaning of some words where the result is in accord with even only occasional usage, when by so doing he has added a distinctive meaning to them, and has thus aided ever so little in enriching topographic nomenclature.

ACCLIVITY: An ascending slope, as opposed to declivity.

ALKALI FLAT: A playa; the bed of a dried up saline lake, the soil of which is heavily impregnated with alkaline salts.

ALPINE: Pertaining to high, rugged mountains containing glaciers; resembling the Alps of Southern Europe.

AMPHITHEATER: A cove or angle of glacial origin near the summit of a high mountain and nearly surrounded by the highest summits. A small flat valley or gulch-like depression at the head of an alpine mountain drainage. Local in far West.

ARETE: A sharp, rocky crest; a comb-like secondary crest of rock which projects to a sharp angle from the side of a mountain. (Fr. origin.)

ARROYO: The channel of an intermittent stream steep cut in loose earth; a coulee. Local in Southwest. (Sp.)

ARTESIAN WELL: A well which has been excavated or drilled through impervious strata to a subterranean water supply which has its source at a higher level. The resulting hydrostatic pressure causes the water to rise in the bore to a sufficient height to overflow at the mouth of the well.

ATOLL : A ring-shaped coral island nearly or quite encircling a lagoon.

BADLANDS : Waste or desert land deeply eroded into fantastic forms. Local in arid Northwest.

BALD : A high rounded knob or mountain top, bare of forest. Local in Southern States.

BANK : A low bluff margin of a small body of water ; a mound-like mass of earth.

BAR : An elevated mass of sand, gravel or alluvium deposited on the bed of a stream or sea or lake, or at the mouth of a stream.

BARRANCA : A rock-walled and impassable canyon. Local in Southwest. (Sp.)

BARRIER BEACH : A beach separated from the mainland by a lagoon or marsh.

BARRIER ISLAND : A detached portion of a barrier beach between two inlets.

BASE-LEVEL PLAIN : A flat, comparatively featureless surface or lowland resulting from the nearly completed erosion of any geographic area.

BASIN : An amphitheater or cirque. Local in Rocky Mountains.

An extensive, depressed area into which the adjacent land drains, and having no surface outlet ; the drainage or catchment area of a stream or lake. Use confined almost wholly to the arid West.

BAY : An indentation in the coast line of a sea or lake ; a gulf.

BAYGALL : A swamp covered with growth of bushes. Local on south Atlantic coast.

BAYOU : A lake or intermittent stream formed in an abandoned channel of a river ; one of the half-closed channels of a river delta. Local on Gulf Coast. (Fr. origin.)

BEACH : The gently sloping shore of a body of water ; a sandy or pebbly margin of land washed by waves or tides.

BED : The floor or bottom on which any body of water rests.

BENCH : A strip of plain along a valley slope.

A small terrace or comparatively level platform on any declivity.

BIGHT : A small bay.

BLUFF : A bold, steep headland or promontory.

A high, steep bank or low cliff.

BOCA : A mouth ; the point at which a streamway or drainage channel emerges from a barranca, canyon or other gorge, and debouches on a plain. (Sp.)

BOG : A small open marsh.

BOLSON : A basin ; a depression or valley having no outlet. Local in Southwest. (Sp., meaning "purse.")

BOX CANYON : A canyon having practically vertical rock walls.

BOTTOM : The bed of a body of still or running water.

BOTTOM LAND : The lowest land in a stream bed or lake basin ; a flood plain.

BOULDER : A rounded rock of considerable size, separated from the mass in which it originally occurred.

BRANCH : A creek or brook, as used locally in Southern States. Also used to designate one of the bifurcations of a stream as a fork.

BREAKS : An area in rolling land eroded by small ravines and gullies. Local in Northwest.

BRIDALVEIL-FALL : A cataract of great height and such small volume that the falling water is dissipated in spray before reaching the lower stream bed.

BROOK : A stream of less length and volume than a creek, as used locally in the Northeast.

BROW : The edge of the top of a hill or mountain ; the point at which a gentle slope changes to an abrupt one ; the top of a bluff or cliff.

BUTTE : A lone hill which rises with precipitous cliffs or steep slopes above the surrounding surface ; a small isolated mesa. Local throughout far West. (Fr. origin.)

CAJON : A box canyon. Local in Southwest. (Sp., meaning "box.")

CALA : A creek. Local in Southwest. (Sp.)

CAMA : A small upland prairie ; a glade ; a small park ; a small, gently sloping prairie, partly wooded and surrounded by high mountain slopes. Local in Pacific Northwest. (Sp. meaning "bed.")

CAÑADA : A very small canyon. Local in Southwest. (Sp.)

CANAL : A sluggish coastal stream.

CANDELAS : A group of candle-like rocky pinnacles. Local in Southwest. (Sp.)

CANYON : A gorge or ravine of considerable dimensions ; a channel cut by running water in the surface of the earth, the sides of which are composed of cliffs or series of cliffs rising from its bed. Local throughout the far West. (Sp. origin.)

CAPE : A point of land extending into a body of water ; a salient of a coast.

CASCADE : A short, rocky declivity in a stream-bed over which water flows with greater rapidity and higher fall than over a rapid ; a shortened rapid, the result of the shortening being to accentuate the amount of fall.

CATARACT : A waterfall, usually of great volume ; a cascade in which the vertical fall has been concentrated in one sheer drop or overflow.

CAVE : A hollow space or cavity under the surface of the earth.

A depression in the ground; by abbreviation from a "cave in," as used colloquially.

CAVERN : A large, natural, underground cave or series of caves.

CAY: A key; a comparatively small and low coastal island of sand or coral. Local in Gulf of Mexico. (Sp. origin.)

CEJA : The cliff of a mesa edge; an escarpment. Local in Southwest. (Sp.)

CERRO : A single eminence intermediate between hill and mountain. Local in Southwest. (Sp.)

CERRITO or CERRILLO : A small hill. Local in Southwest. (Sp.)

CHANNEL: A large strait, as the British Channel; the deepest portion of a small stream, bay or strait through which the main volume or current of water flows.

CHASM : A canyon having precipitous rock walls.

CIENAGA : An elevated or hillside marsh containing streams. Local in Southwest. (Sp.)

CONE : A low, conical hill, built up from the fragmental material ejected from a volcano.

CIRQUE : A glacial amphitheater or basin. (Fr. origin.)

CLIFF : A high and very steep declivity.

CLOVE: A gorge or ravine. Local in Middle States. (Dutch origin.)

COAST : The land or the shore next to the sea.

COASTAL MARSH : One which borders a seacoast and is usually formed under the projection of a barrier beach.

COASTAL PLAIN : Any plain which has its margin on the shore of a large body of water.

CONTINENTAL SHELF : A comparatively shallow marginal ocean bed or floor bordering a continent; a submerged terrace bordering a continent.

CORDILLERA : A group of mountain ranges, including valleys, plains, rivers, lakes, etc. ; its component ranges may have various trends, but the cordillera will have one general direction. (Sp. origin.)

COTEAU: An elevated, pitted plain of rough surface. Local in Missouri and neighboring States. (Fr. origin.)

COULEE: A cooled and hardened stream of lava. Coulees occur as ridges of greater or less length and dimensions, but rarely of great height. Local in Northwest.

A wash or arroyo through which water flows intermittently. Local in Northwest. (Fr. origin.)

COVE: A small bay.

An amphitheater or indentation in a cliff. It may be the abrupt heading of a valley in a mountain.

CRAG: A rough, steep or broken rock standing out or rising into prominence from the surface of an eminence; a rocky projection on a cliff or ledge.

CRATER: The cup-shaped depression marking the position of a volcanic vent; its margin is usually the summit of the volcano.

CREEK: A stream of less volume than a river.

A small tidal channel through a coastal marsh.

CREST: The summit land of any eminence; the highest natural projection which crowns a hill or mountain.

CUESTA: An ascending slope; a tilted plain or mesa top. Local in Southwest. (Sp.)

CURRENT: A continuous movement or flow, in one direction, of a body of water; a stream in or portion of an ocean which has continuous motion or flows in one direction.

DALLE: A rapid. (Fr. origin.)

DECLIVITY: A descending slope, as opposed to acclivity.

DEFILE: A deep and narrow mountain pass.

DELTA: The mouth of a river which is divided down stream into several distributaries.

DEPRESSION: A low place of any dimensions on a plain surface; the negative or correlative of elevation or relief.

DESERT: An arid region of any dimensions, barren of water other than in occasional flood streams or springs; frequently covered with considerable growths of cacti, coarse bunch grass, mesquite and other shrubs. A desert is not necessarily a plain surface, as most deserts are broken by the sharp escarpments and buttes which are common to the arid regions; by sand dunes or volcanic ejecta. A desert may include canyons and mountains of considerable differences of elevation.

DIKE: A ridge having for its core a vertical wall of igneous rock.

DIVIDE: The line of separation between drainage systems; the summit of an interfluve.

The highest summit of a pass or gap.

DOME: A smoothly rounded rock-capped mountain summit. Local in the Sierra Nevada.

DRAFT: A draw.

DRAW: A very shallow and small gorge, gulch or ravine; the eroded channel through which a small stream flows.

DRIFT: A slow, great ocean current.

DRUMLIN: A smooth, oval or elongated hill or ridge composed chiefly of glacial detritus.

DRY WASH: A wash, arroyo or coulee, in the bed of which is no water.

DUNE: A hill or ridge of sand formed by the winds near a sea or lake shore, along a river-bed or on a sandy plain.

EMINENCE: A mass of high land.

ESCARPMENT: An extended line of cliffs or bluffs.

ESKER: A long, winding ridge of sand or gravel; the deposit from a stream flowing beneath a glacier.

EVERGLADE: A tract of swampy land covered mostly with tall grass. Local in South.

FALL: A waterfall or cataract; the flow or descent of one body of water into another.

FAN: A mountain delta; a conical talus of detrital material.

FIORD: A narrow inlet with high, rocky walls. A glacial gorge filled by an arm of the sea.

FLAT: A small plain usually situated in the bottom of a stream gorge; often applied to a small area of tillable land in the bend of a bluff-walled stream.

FLOODPLAIN: Any plain which borders a stream and is covered by its waters in time of flood.

FLOOR: The bed or bottom of the ocean; a comparatively level valley bottom.

FLY: Corrupted from Vly; local in Adirondacks of New York.

FOOT: The bottom of a slope, grade or declivity.

FOOTHILL: One of the lower subsidiary hills at the base of a mountain.

FORK: One of the major bifurcations of a stream; a branch.

FOUNTAIN: A flow of water rising in a jet above the surrounding surface. Artesian wells, geysers and springs may be fountains.

FUMAROLE: A spring or geyser which emits steam or gaseous vapor; found only in volcanic areas. (Ital.)

GAP: Any deep notch, ravine or opening between hills or in ridge or mountain chain.

GEYSER: A hot spring, the water of which is expelled with steam in an accumulated volume in paroxysmal bursts.

GLACIER: A permanent body or stream of ice having motion.

GLACIAL GORGE: A deeply cut valley of V-shaped cross-section, the result of glacial erosion.

GLACIAL LAKE: One, the basin of which has been carved by glacial action; a lake dammed on one side by glacial detritus.

GLADE: A grassy opening or natural meadow in the woods; a small park. In western Maryland, applied to a brushy, grassy, or swampy opening in the woods.

GORGE: A canyon; a rugged and deep ravine or gulch.

GRADE: A slope of uniform inclination.

GROTTO: A small, picturesque cave.

GULCH: A small ravine; a small, shallow canyon with smoothly inclined slopes. Local in far West.

GULF: A gorge or deep ravine; a short canyon. Local in Southern mountains and New York.

A bay, usually of great dimensions.

GULLY: A channel cut by running water; less than a gulch or ravine.

GUT: A narrow passage or contracted strait connecting two bodies of water.

HANGING VALLEY: A high glacial valley, tributary to a more deeply eroded glacial gorge or fiord.

HEADLAND: A promontory.

HEIGHT OF LAND: The highest part of a plain or plateau; or, on a highway, a pass or divide. Local in Northeast and British America.

HIGHLAND: A relative term denoting the higher land of a region; it may include mountains, valleys, and plains.

HILL: An eminence less than a mountain, rising above the surrounding land.

HOGBACK: A steep-sided ridge or long hill; used to describe a group of sharply eroded low hills.

In the far West a steep foothill, having parallel trend to the associated mountain range.

HOLE: A small bay, as Wood's Hole, Mass. Local in New England.

HOLLOW: A small ravine; a low tract of land encompassed by hills or mountains.

HOOK: A low, sandy peninsula terminating in curved or hook-shaped end forming a bay.

HOT SPRING: A spring, the water of which has a temperature considerably above that of its surroundings.

HUERFANO: A solitary hill or cerro. Local in Southwest. (Sp., meaning "Orphan.")

INLET: A small narrow bay or creek; a small body of water leading into a larger.

INTERFLUVE: The upland separating two streams having approximately parallel course.

ISLAND: An area of land entirely surrounded by water. In dimensions islands range from a point of rock rising above the surface of the water to an area of land of continental dimensions, as Australia.

ISTHMUS: A narrow strip of land connecting two considerable bodies of land.

KAME: A small hill of gravel and sand made by a glacier.

KETTLE HOLE: A steep-sided hole or depression in sand or gravel; a hole in the bottom of a stream or pond.

KEY: A cay, as the Florida Keys.

KILL: A creek. Local in Middle States. (Dutch origin.)

KNOB: A prominent peak with rounded summit. Local in Southern States.

KNOLL: A low hill.

LAGOON: A shallow bay cut off from a sea or lake by a barrier; often stagnant with ooze bottom and rank vegetation. It may be of salt or fresh water. Local in South and Southwest. (Sp. origin.)

LAKE: Any considerable body of inland water.

LANDSLIDE: Earth and rock which has been loosened from a hillside by moisture or snow, and has slid or fallen down the slope.

LANDSLIP: A landslide of small dimensions.

LATERAL MORAINE: A moraine formed at the side of a glacier; usually ridge-like in shape.

LEDGE: A shelf-like projection from a steep declivity; a rocky outcrop or reef.

LENTICULAR HILL: A short drumline.

LITTORAL: That portion of a shore washed by, or between high and low water.

MALPAIS: A badland. Local in Northwest. (Fr.)

MARSH: A tract of low, wet ground, usually miry and covered with rank vegetation. It may at times be sufficiently dry to permit of tillage or of having hay cut from it. It may be very small and high on a mountain, or of great extent and adjacent to the sea.

MEADOW: A bit of natural grassland in wooded mountains; a glade or small park. Local in far West.

MESA: A tableland; a flat-topped mountain bounded on at least one side by a steep cliff; a plateau terminating on one or both sides in a steep cliff. Local in Southwest. (Sp. origin.)

MESITA: A small mesa. Local in Southwest. (Sp.)

MIRE: A small, muddy marsh or bog.

MONADNOCK : An isolated hill or mountain rising above a peneplain, after the removal by erosion of its surrounding features.

MONUMENT : A column or pillar of rock. Local in Rocky Mountain region.

MORAINE : Any accumulation of loose material deposited by a glacier.

MORASS : A swamp, marsh or bog having rank vegetation and muddy or offensive appearance.

MOUND : A low hill of earth.

MOUNTAIN CHAIN : A series or group of connected mountains having a well defined trend or direction.

MOUNTAIN : An elevation of the surface of the earth greater than a hill and rising high above the surrounding country.

MOUNTAIN RANGE : A short mountain chain ; a mountain much longer than broad.

MOUNTAIN SYSTEM : A cordillera.

MOUTH : The exit or point of discharge of a stream into another stream or a lake or sea.

MUSKEG : A bog or marsh. Local in Northwest and British America.

NECK : The narrow strip of land which connects a peninsula with the mainland.

NÉVÉ : The consolidated granular snow on a mountain summit in which glaciers have their source.

NOTCH : A short defile through a hill, ridge or mountain.

NUNATAK : A rock island in a glacier.

OCEAN : The great body of water which occupies two-thirds of the surface of the earth. The sea as opposed to the land.

OCEANIC PLATEAU : An irregularly elevated portion of the ocean bed, of considerable extent and perhaps rising in places above the water surface.

OUTLET : The lower end of a lake or pond; the point at which a lake or pond discharges into the stream which drains it.

PAHA : A long ridge of fine, loamy material deposited from a stream which has cut a channel in a melting glacier. Local in Iowa and vicinity. (Indian.)

PALISADE : A picturesque, extended rock cliff rising precipitately from the margin of a stream or lake, and of columnar structure.

PARK : A grassy, wide, and comparatively level open valley in wooded mountains. Local in Rocky Mountains.

PASS : A gap or other depression in a mountain range through which a road or trail may pass; an opening in a ridge forming a passageway. A narrow, connecting channel between two bodies of water.

PEAK : A pointed mountain summit; a compact mountain mass with single conspicuous summit.

PENEPLAIN : A land surface which has been reduced to a condition of low relief by the erosive action of running water.

PENINSULA : A body of land nearly surrounded by water.

PICACHO : A peaked butte. Local in Southwest. (Sp.)

PINNACLE : Any high tower or spire-shaped pillar of rock, alone or cresting a summit.

PITTED PLAIN : A plain of gravel or sand with kettle holes.

PLAIN : A region of general uniform slope, comparatively level, of considerable extent and not broken by marked elevations and depressions; it may be an extensive valley floor or a plateau summit.

PLATEAU : An elevated plain. Its surface is often deeply cut by stream channels, but the summits remain at a general level. The same topographic form may be called a plain and a plateau, and be both. An elevated tract of considerable size and diversified surface. (Fr.)

PLAYA : An alkali flat; the dried bottom of a temporary lake, without outlet. Local in Southwest. (Sp. origin.)

A small area of land at the mouth of a stream and on the shore of a bay; an alluvial flat coast land as distinguished from a beach. Local in Southwest. (Sp.)

PLAYA LAKE : A shallow, storm-water lake. When dried it forms a playa. Local in Southwest. (Sp. origin.)

PLAZA : An open valley floor; the flat bottom of a shallow canyon. (Sp.)

POCOSON : A swamp. Local on South Atlantic coast. (Indian.)

POINT : A small cape; a sharp projection from the shore of a lake, river, or sea.

POND : A small, fresh-water lake.

POOL : A water-hole or small pond.

POTHOLE : A basin-shaped or cylindrical cavity in rock, formed by stone or gravel gyrated by eddies in a stream.

PRAIRIE : A treeless and grassy plain.

PROMONTORY : A high cape with bold terminations; a headland.

PUERTA : A pass or defile through an escarpment or sierra. Local in Southwest. (Sp. meaning "gate.")

QUAGMIRE : Any mire or bog.

QUEBRADA : A canyon of rugged aspect; a fissure-like ravine or canyon. Local in Southwest. (Sp.)

RAPID : Any short reach of steep slope between two relatively quiet reaches in a stream-bed. The water over a rapid flows with greater velocity than in adjacent portions of a stream.

RAVINE : A gulch ; a small gorge or canyon, the sides of which have comparatively uniform slopes.

REEF : A ridge of slightly submerged rocks.

A ledge of rock.

RELIEF : Elevation as opposed to depression; the elevated portions of the land surface.

RIDGE : The narrow, elongated crest of a hill or mountain. An elongated hill.

RIFFLE : The shallow water at the head of a rapid; a rapid of comparatively little fall.

RIFT : A narrow cleft or fissure in rock.

RILL : A very small trickling stream of water, less than a brook.

RINCON : Corner or cove ; the angular indentation in a mesa edge or escarpment in which a canyon heads. Local in Southwest. (Sp. origin.)

RIO : A river. Local in Southwest. (Sp. origin.)

RIVER : A large stream of running water. A stream of such size as to be called a river in one locality may be called a creek or brook in another.

ROCK CAVE : A shelter cave.

ROLLING LAND : Any undulating land surface ; a succession of low hills giving a wave effect to the surface.

RUN : A brook or small creek. Local in South.

SÁLIENT : An angle or spur projecting from the side of the main body of any land feature.

SAND DUNE : Any dune.

SANDIA : An oblong, rounded mountain mass. Local in Southwest. (Sp., meaning "watermelon.")

SCARP : An escarpment.

SEA : A large body of salt water.

SEEP ; A small, trickling stream. Local in Southwest.

SERRATE : The rocky summit of a mountain having a sawtooth profile ; a small sierra-shaped ridge. Local in Southwest. (Sp.)

SHELTER CAVE : A cave only partially underground, which is formed by a protecting roof of overlying rock; generally open on one or more sides.

SHOAL : A shallow place in a stream or lake ; an elevated portion of the bed of a stream, lake, or sea, which rises nearly to the water surface ; a bar.

SHORE : The land adjacent to any body of water.

SIERRA : A rugged mountain range with serrate outline. Local in Southwest and Pacific States. (Sp. origin.)

SINK : The bottom of an undrained basin.

SLIDE : The exposed surface left in the trail of a landslide ; the place whence a landslide has departed. Local in Northeast.

SLOPE : The inclined surface of a hill, mountain, plateau, or plain or any part of the surface of the earth ; the angle which such surfaces make with the level.

SOUND : A relatively shallow body of water separated by an island from the open sea and connected with it at either end so that through it there is clear tidal flow.

SPIT : A low, sandy point or cape projecting into the water ; a barrier beach.

SPRING : A stream of water issuing from the earth.

SPUR : A sharp projection from the side of a hill or mountain ; a radial ridge of subordinate dimensions.

STILLWATER : Any reach in a stream of such level inclination as to have scarcely any perceptible velocity of flow ; a sluggish stream, the water of which appears to be quiet or still. Local in Northeast.

STRAND : The shore or beach of the ocean or a large lake.

STRAIT : A relatively narrow body of water connecting two larger bodies.

STREAM CHANNEL : The trench or depression washed in the surface of the earth by running water ; a wash, arroyo, or coulee.

STREAM : Any body of flowing water. It may be of small volume, as a rill, great as the Mississippi or mighty as the Gulf Stream in the Atlantic Ocean.

SUGARLOAF : A conical hill comparatively bare of timber. Local in far West.

SUMMIT : The highest point of any undulating land, as of a rolling plain, a mountain or a pass in a mountain.

SWALE : A slight, marshy depression in generally level land.

SWAMP : A tract of stillwater abounding in certain species of trees and coarse grass on boggy protuberances.

TABLE : An elevated, comparatively level bit of land between two streams. Local in Northwest.

TABLE LAND : A mesa.

TABLE MOUNTAIN : A mountain having comparatively flat summit and one or more precipitous sides. A mesa.

TALUS : A collection of fallen disintegrated material which has formed a slope at the foot of a steeper declivity.

TANK : A pool or water-hole in a wash. Local in arid West.

TERMINAL MORAINE : A moraine formed across the course of a glacier, irregularly ridge-like in shape.

TERRACE : A relatively narrow level space or bench on the side of a slope and terminating in a short declivity.

TERRAIN : See Terrane.

TERRANE : An extent of ground or territory ; a portion of the surface of the earth. (Fr.)

TERRENE : Pertaining to the earth.

TETON : A rocky mountain-crest of rugged aspect. Local in Northwest. (Fr.)

THALWEG: A watercourse; a valley bottom; the deepest line or part of a valley sloping in one direction. (Ger.)

TIDAL MARSH OR FLAT: Any marsh or flatland which is wetted by a tidal stream or sea.

TONGUE: A narrow cape.

TOWER: A peak rising with precipitous slopes from an elevated table land. Local in Northwest.

TUNDRA: An upland or alpine marsh, the ground beneath which is frozen. There are great areas of tundra in the Arctic. (Russ.)

UPLAND: A highland.

VALLEY: A depression in the land surface generally elongated and usually containing a stream.

VLEI: See Vly.

VLY: A small swamp, usually open and containing a pond. Local in Middle Atlantic States. (Dutch origin.)

VOLCANO: A mountain which has been built up by the materials forced from the interior of the earth, piling about the hole from which they were ejected. These may be lava, cinders or dust.

VOLCANIC NECK: The solid material which has filled the throat or vent of a volcano, and has resisted degradation better than the mass of the mountain. It thus finally stands alone as a column or crag of igneous rock.

WASH: The broad, dry bed of a stream; a dry stream channel. Local in arid West.

WATERFALL: Any single cataract, Both the terms, waterfall and cataract, may be applied to falls of like magnitude.

WATER GAP: A pass through a mountain occupied by an existing stream.

WATERSHED: The ridge of high land or summit separating two drainage basins; the summit of land from which water divides or flows in two or more directions; the area drained by a stream.

WELL: Any excavation in soil or rock which taps underground water.

WIND GAP: An elevated gap not occupied by a watercourse.

NOTES ON CLIMATOLOGY.

BY

ROBERT DEC. WARD.

THE PLAGUE AND CLIMATIC CONDITIONS.—At the December meeting of the Royal Meteorological Society (London), Mr. Baldwin Latham, M.Inst. C.E., read a paper on *The Climatic Conditions necessary for the Propagation and Spread of Plague.* Mr. Latham believes that the bubonic plague, which is primarily due to a specific organism or microbe so small that probably 250 millions of them would be required to cover a square inch of surface, is greatly influenced by pestilential emanations from polluted and water-logged soils. The author gives accounts of various outbreaks of plague in England and other countries, including the great plague of London in 1665, when 7,165 deaths were recorded in one week in September. Plague is undoubtedly a disease of the poor, and attacks most readily those living on low diet. That the ground itself exercises an influence upon plague is shown by the fact that, in all the epidemics, persons living on the ground floors suffer to a much greater extent than those living on the upper floors of houses. Mr. Latham says that there can be no doubt that the conditions which ordinarily produce evaporation from water or land surfaces are identical with those which produce exhalations from the ground, and these exhalations consist largely of vapor of water, carrying matters injurious to health. The author has discussed the meteorological observations (including the temperature of the soil at depths of 9, 20, 60 and 132 inches) made at the Colaba Observatory, Bombay, and has compared them with the number of deaths from plague during the recent epidemics in Bombay. He says that if the temperature of the air increases beyond the temperature of the ground, so that its dew-point is above the temperature of the ground, condensation takes place instead of evaporation. To this increased high temperature may be due the sudden stoppage of plague after a certain high temperature has been reached, which, by raising the temperature of the dew-point, stops all exhalation from the ground and may cause condensation to take place instead of evaporation. So also a sudden fall of temperature causes plague to arise, for a fall of temperature means that the temperature of the

dew-point must fall, and the tensional difference between a low dew-point and a high ground temperature would at once lead to exhalations from the ground, and so to the liberation of the plague bacillus from the ground, accompanied by the exhalations necessary for its development.

This question of the relation between the plague and climatic conditions, one aspect of which is considered in Mr. Latham's paper, is one which is by no means settled. While it used to be thought that the plague could not occur in the Torrid Zone, it is now known, in view of outbreaks of the disease within the tropics in Arabia and India, that this rule does not hold rigidly. In Egypt the autumn seems to be the season in which the plague appears, and June the month in which it dies out. In Europe, outside of Turkey, the plague season has been summer and autumn. In India no direct connection with the seasons could be detected in the epidemics of 1815–21 (the first outbreak concerning which we have trustworthy information) and of 1836–38. From all the data at hand, the general conclusion is that a moderately high temperature favors the development and extension of the plague, but extremes of heat and cold are unfavorable to its breaking out. Exceptions to this rule are many. For instance, in the epidemic at Smyrna, in 1735, the heat was so excessive during the plague that many of the people who left the town for neighboring villages died of sunstroke on the way; while in Roumelia, in 1737–38, the plague continued in many places in which the temperature fell at times to 3° Fahr. Regarding the effect of atmospheric moisture there is also some doubt. Some authorities hold that a high degree of humidity is necessary for the epidemic extension of the plague, while others maintain the opposite view. Certainly the occurrence of many outbreaks at high altitudes in Kurdistan, Arabia, China and India makes it clear that a moist atmosphere is not always an essential in the spread of the epidemic. Again, in the present outbreak of plague in India, a station at an altitude of 14,000 feet in Russian Turkistan has been visited by the disease, and over one-half of the inhabitants died before medical assistance was sent there. At this place, Augzap, the climate is both cold and dry, and very different from the hot, moist climates near sea-level.

The Rainy Season Campaign in the Philippines.—In the *Journal of School Geography* for December an article by R. DeC. Ward discusses the climate of the Philippine Islands, and calls attention to some of the more important relations of these climatic

conditions to man. It is inevitable that so strong a contrast between different parts of the year as that between the rainy and dry seasons in the Philippines should exercise marked controls over the customs, occupations and general conditions of life of the inhabitants of the islands. In this connection the article referred to says:

"Our chief interest in this seasonal control over human activities in the Philippines has, since last May, been centered in the bearing of the past rainy season upon the military campaign which our troops have been carrying on in those new possessions of ours. Anyone with even the vaguest ideas as to what a tropical rainy season is, would certainly never have expected that an active aggressive military campaign could be carried on by white troops during the months from June to October. Yet under date of May 29th last, a press despatch from Manila, printed in all our leading newspapers, made the emphatic statement that the commanding general at Manila 'says the campaign against the Filipino insurgents will be prosecuted by the American forces with the utmost aggressiveness possible during the rainy season. We will show the insurgents by vigorous action on the rivers, lakes and mountains that their belief that we cannot campaign in the rainy season or in the mountains is untrue.' That this proposed active campaign has not been carried out everyone who has read our newspapers through the past summer knows full well.

"The difficulties that have beset our troops in the Philippines since the beginning of the rains are now familiar to Americans. With the roads deep in mud or overflowed with water, so that marching became extremely difficult, if not altogether impossible, the sufferings of the men under the oppressive moist heat were surely terrible. Cases of prostration by the heat and of sunstroke were very frequent, far more so than the strict censorship of the press at Manila has led people here to suppose. In one press despatch it was said (April 28th): 'If the American troops were not fighting the heat as well as the rebels, they might pursue the natives until they compelled them to scatter in the mountains, but the soldiers are so wilted that they must rest.' The buffaloes used to drag the guns and camp wagons succumbed to the heat in large numbers. After a day's march in drenching rains, through mud so deep and so sticky that it was often impossible to pull their legs out after taking a step, and with water up to their waists, our men frequently had advanced but seven or eight miles, or at the rate of about one mile an hour. The Manila correspondent of the *Army and Navy Journal* (New York), in a letter published July 8th, says: 'The rain has been falling almost continuously. The whole country is flooded. The trenches at San Fernando are ditches of water and the mud is knee-deep in the temporary camps at several of the outlying towns.' The same writer in a letter published July 22d, says: 'Manila resembles an Arkansas town after a spring freshet. The heavy rains, which have amounted thus far to more than 30 inches in July, have converted the streets into waterways, and boats have been doing a merry commerce from street to street. Where a few days ago was heard the booted foot-fall of the American sentry, arises the splash of paddle and oar. The surrounding country is equally flooded, and the American soldier now knows what camnpaigning in a rainy season means.'

"These quotations must suffice to give a general idea of the conditions under which troops have to live during a Philippine rainy season. That an aggressive campaign cannot be carried on under these conditions is perfectly clear. Even the Army officers themselves, who boasted of their ability to proceed just the same in the summer months as in the winter, have now been compelled to acknowledge their

mistake. It is interesting, in connection with the press despatch of May 29th, above referred to, to note that the *Army and Navy Journal* for October 14th, p. 139, says: 'No one expected much activity * * * * during the rainy season.'"

METEOROLOGY OF HAVANA IN 1898.—The following data relating to temperatures and rainfall at Havana during the year 1898 have been compiled for these NOTES from the *Observaciones Magnéticas y Meteorológicas del Observatorio del Colegio de Belen de la Compañia de Jesus en la Habana, Año de 1898.*

Mean monthly temperatures: January, 72.3°; February, 70.0°; March, 73.0°; April, 75.7°; May, 77.9°; June, 80.6°; July, 81.0°; August, 80.6° ; September, 80.4°; October, 78.1°; November, 76.5°; December, 72.5°.

Mean annual temperature: 76.5°. Absolute maximum temperature: 91.4°, in August. Absolute minimum temperature: 54.0°, in January.

Mean relative humidity: 74.7%. Maximum monthly relative humidity: 82% in October. Minimum monthly relative humidity: 67.9%, in March.

Monthly rainfall: January, 0.02 in.; February, 2.02 in.; March, 1.06 in.; April, .86 in.; May, 1.38 in.; June, 2.95 in.; July, 5.79 in.; August, 6.74 in.; September, 5.63 in.; October, 11.20 in.; November, 1.87 in.; December, .24 in. Total rainfall for the year: 39.76 in.

Comparing these data for 1898 with the means derived from 10 years' observations, 1888–1897, by Prof. H. A. Hazen, it appears that the year 1898 had very nearly the average annual temperature. The warmest month, July, was 1.4° cooler than the average for that month, and the coolest month was February, with 70.0°, whereas January is usually the coolest, with a mean of 70.3°. The annual rainfall in 1898 was about 12 inches less than the average rainfall based on the 10 years' record.

THE WEATHER AND THE DAIRY.—A point of some economic importance in connection with the effect of our winter cold upon the amount and quality of the milk given by cows has recently been noted in the *Monthly Weather Review* of the U. S. Weather Bureau. In general, it appears that there is a decided diminution in the yield of milk and in the cream as soon as the weather turns cold. The practice of some dairymen of keeping their barns artificially heated during the cold weather thus finds abundant justification. Furthermore, the practice of allowing cattle to stay in the fields or open pens all night during the winter months is productive of great

loss to the farmers of the Southern States. The food given to the animals goes first of all towards the maintenance of life and animal heat, and the surplus only goes to the production of increased flesh and milk. A fall in temperature cuts off this surplus. Some records made at a Texas station during a "Norther" show that the first effect of the cold was to increase the yield of butter, but the continued effect was to decrease both butter and milk by 20%, and the cows did not recover for several days after the cold weather. If ice-cold water is given to cows, there is a fall of 6% to 8% in the yield of milk as compared with that when the drinking water is warm. This subject has lately been studied by Mr. E. A. Evans, of the Virginia State Weather Service, the results of whose investigations have been summarized in the foregoing statements.

NOTES ON ANTHROPOLOGY.

BY

ROLAND B. DIXON.

THE ARYAN QUESTION.—There are few subjects which have been more discussed during the last thirty or forty years than the various questions in regard to the origin and migrations of the Aryan race. The earlier period of purely philological investigation has given way to a general study of all the aspects of the matter, and new theories of the most opposite character have been developed. One of the most recent works on this subject is the forthcoming one of Lapouge, the introductory chapter of which has recently been published in the *American Journal of Sociology* (Nov., 1899, pp. 329–347). In this, which is in some measure a résumé of the whole work, he declares that although there was probably no such thing as an "Aryan race," yet there must have been a dominant type among the various types that spoke Aryan languages, and that this dominant type, which was responsible for much, if not most, of the civilization of the European peoples, was the dolichocephalic blond. The history of the Aryan controversy is briefly reviewed, in order to show the change of opinion from the earlier theories of the original unity of the Indo-Germanic peoples, and the development of the different languages by the hiving off of successive groups of the postulated primitive Aryans, to the later views that Sanscrit and Zend were not the oldest-known forms of the whole group of languages, and that the origin of these was rather to be ascribed to the "collective evolution" of the languages of a group of nomad or semi-nomad tribes, whose languages had originally been more or less closely related. In this process each dialect would necessarily influence its geographical neighbors; in the course of time the stronger would eliminate the weaker; and the present languages, related collaterally rather than by direct descent, would be thus produced. Since the relations between the different languages more or less closely correspond to their present geographical positions, Lapouge thinks it possible that the peoples speaking the different languages to-day may always have been neighbors as at present, and that the Aryan civilization and language therefore developed in Europe. From this point of view, there can be no distinct "Aryan type," as the Aryan civilization and language were both the result of the coa-

lescing of several types. In his opinion, however, the major part of the civilization is to be attributed to a dominant type, and this, he thinks, must have been the "dolicho blond." The brachycephalic peoples, whose remains are found associated sometimes with the dolicho blonds, were, Lapouge considers, the slaves or serfs of the latter.

This theory will doubtless be attacked by the holders of other views. It is difficult to see where the positive proof is found that the dolichocephalic type was also blond. Ripley, in summing up the opinions of various writers, although showing that there is little uniformity in their views, yet advances very plausible arguments to prove that this same dolichocephalic type was brunet or africanoid in character;—definite proof, however, seems almost impossible.

TOTEMISM.—A flood of new light has been thrown on this hitherto rather obscure subject by the splendid work of Spencer and Gillen on the "Native Tribes of Central Australia" (London, 1899), to which attention has been called by Frazer (*Journal Anthrop. Inst.*, new series I; pp. 281–6). Among the Arunta and other neighboring tribes the institution differs markedly from that found elsewhere in Australia and other parts of the world. As a rule, we find that the different totemic groups into which many tribes are divided are exogamic;—each member must marry outside his or her own totem, and this is the case even where the tribe is subdivided into other divisions unconnected with the totemic grouping. In the Arunta, however, the various totemic groups are not exogamic. The whole tribe is divided into two moieties, each of which again is divided into two, so that there are four classes, of which the Panunga and Bulthara together constitute the first moiety, and the Kumara and Purula the second. A member of any one of these four classes is bound to marry into a certain one of the opposite moiety, as, for example, a Panunga marries a Purula, and vice-versa. But each individual, besides being a member of one of these four classes, is by birth a member of some totemic group. In other tribes these totemic groups are each confined to one moiety or class, that is, all the men and women of the Wild-cat totem belong to a single class, so that in marrying they always marry a member of some other totem. Here, however, the situation is different. A man belongs to a certain totem because he was born in a certain region which is closely associated with some animal or plant ancestor, and all men or women born, or, rather, conceived within this

particular region, belong to the same totem. Members of the same totem may therefore be found in all the classes, and the totems cease on that account to be exogamic.

The second point of great interest in the totemic system of these Arunta natives is the peculiar "localization" of the totem. As already stated, the child takes its totem from the particular region in which it was conceived; the explanation of this custom is as follows. In the distant past certain persons lived in the same region which the Arunta inhabit to-day. These individuals were in character half men and half animal, and were in a way the ancestors of the present tribe. At various places throughout the region these people "entered the earth" or buried certain sacred stones, known as Churinga, and there, with those stones or in some natural feature of the landscape, their spirit parts remained. These spirit individuals are constantly on the watch for opportunities to be born, and enter into women who pass near their abode, and are born as children. These, since they are virtually reincarnations of the Alcheringa individuals (as the people of the past are called) naturally take as their totem that which was the totem of the Alcheringa individual whose reimbodiment they are. Thus, if a child is conceived in a locality in which, according to tradition, a Wild-cat man of the Alcheringa buried Churinga, he belongs to the Wild-cat totem. This being the method by which each individual receives his or her totem, it follows that the different children of one couple may each have a different totem;—a condition almost without a parallel among other tribes where the totemic system prevails.

Perhaps of greater interest than either of the foregoing is the portion of the book devoted to an exposition of the ceremonies which each totem is in the habit of performing. These are, in brief, for the purpose of increasing the supply of the particular animal which is the totem of the group. Thus the Kangaroo totem performs ceremonies, the object of which is to increase the supply of kangaroos; the Bakea-flower totem performs other ceremonies to insure a plentiful crop of bakea-flowers, etc. Moreover, the members of the Kangaroo totem are not forbidden to eat kangaroo, as is generally the case with any totemic group. On the contrary, they may eat of it sparingly, and at times are obliged to eat it;—if they did not they would be unable to perform the ceremonies satisfactorily. The same holds true of all other totems. In early days, according to the traditions, there was no restriction as to how much one should eat, and apparently the members of the totem then had first right to the animals whose name they bore. To-day

they eat but little, but aid others to capture and kill the animal. These facts, taken in connection with the regulations as to marriage, etc., seem to show that in Central Australia, at least, the function of the totemic group was primarily to increase the supply of its own peculiar animal or plant, or if it was a group like the Water totem, to cause rain in time of drought;—its sociologic function, in regulating marriage by dividing the tribe into a series of exogamic groups, is here secondary, and in the Arunta, at least, entirely absent.

It is difficult to say too much in praise of the work done by Professor Spencer and Mr. Gillen. They have produced what is probably the most complete and perfect record of the sacred rites and ceremonies of any tribe of savage men, and apart from the extreme value of the facts they have recorded, their work must stand as a pattern for many years to all other investigators along the same line.

ORIGIN OF GENDER.—Mr. J. G. Fraser, in the *Fortnightly Review* for January (pp. 79–91), presents a theory of the origin of grammatic gender which is, in many ways, quite novel. The theory which he offers is that, at least in part, grammatic gender is due to the marriage of men of one tribe with women belonging to another. A man and his wife would then speak different languages, and each would have their own words for all objects. In time these two languages would, according to the theory, become more or less amalgamated, especially if, as might be possible, the men and women both belonged to the same linguistic stock. In this case, the difference in vocabulary would be chiefly in form and pronunciation, and not an absolute difference. It is assumed that in time these two dialects or languages would tend to become confounded; the proper dialect of each tribe would be spoken less and less correctly, and finally, by elision and otherwise, the duplicate forms would be lost, and only a single one survive. If, in this struggle for existence and "survival of the fittest," the term which finally remained was one that had been used by the men, the word would be of the masculine gender; if, on the other hand, it had been in use by the women, it would become of the feminine gender. Disregarding Mr. Fraser's further remarks on the subject of "Subjective and Objective Gender," a word or two might be said in regard to the theory just outlined. It seems, in the first place, very unlikely that there should have been so general a marrying between tribes speaking different languages. Again, if this theory is true,

it would follow that there would be no regularity in the genders of nouns. While it is true that in many cases there is little assignable cause for the gender of inanimate objects (to which this theory especially applies), yet they can often be grouped into classes with more or less regularity;—which would not be possible were the gender of an object determined by chance alone. Furthermore, gender is not, in general, a difference in the words so much as a distinction between them by means of some suffix or prefix, the root or stem remaining the same. It seems also rather problematical whether masculine and feminine gender could be developed respectively from the words used by the men and women; and the further fact remains that in a large number of languages there is no sex gender at all, the distinction being made rather between animate and inanimate, or on some other basis. In these cases, at least, the theory does not appear applicable

PHYSIOGRAPHIC NOTES.

BY

RALPH S. TARR.

GEOLOGY AND PHYSICAL GEOGRAPHY OF JAMAICA.—For a number of years Prof. Robert T. Hill has been investigating the interesting phases of the geology and geographical development of Central America and the West Indies. His latest contribution—a well-illustrated report upon the Island of Jamaica (*Bulletin, Museum Comparative Zoology*, XXXIV., 1899, pages 1–256)—gives a concrete statement of the geographical development of this island and its relation to the other islands of the West Indies and the neighboring mainland.

Jamaica lies in "almost the exact center of the great Mediterranean," being about 65 miles south of eastern Cuba and almost due west of Haiti. Between Cuba and Jamaica the ocean descends to a depth of fully 18,000 feet, and the island itself rises, in its highest peaks—those of the Blue Mountains—to an altitude of 7,360 feet. On the island there are four great groups of rocks: (1) the oldest—a series of stratified and volcanic rocks, greatly displaced and deformed; (2) a series of marls and limestones of oceanic origin; (3) a variety of igneous rocks, penetrating the first and second, and, therefore, younger than either; and (4) more recent deposits of ocean marls and coral reef rocks.

The geologist will find many interesting details in this report, especially the discussion of the extensive deposits of limestone and the consideration of the various causes for the formation of these rocks,—a subject usually treated with great brevity.

The geographer will find here an interesting statement not only of the development of Jamaica, but of its relation to past changes in the West Indian-Central American region. According to Hill, the known history of Jamaica begins in the latter Cretaceous time, during which volcanic action was in progress. There then followed an extensive degradation, during which the high pre-existing land, covered with vegetation, was deeply worn and great beds of sediment were assorted and deposited in shallow waters. Subsidence accompanied this deposition, and this was closely followed by folding of the strata through the Miocene, during which the rocks were closely flexed and even completely overthrown. There then followed

a deep subsidence, reaching certainly more than 7,000 feet, during which beds of deep-sea ooze were accumulated, and most, if not all of Jamaica was lowered beneath the sea. Then came an uplift, which not only restored the former land area, but extended it far beyond its present outline, connecting it with the adjacent island of Haiti on the east and possibly the Central American region to the southwest. This emergence was dominated by a low east and west folding, which caused the present elongate shape of Jamaica, and accompanying it was a great intrusion of igneous rock from below. The next stage in the history of the island was a renewal of the subsidence, which was succeeded by another upward movement, accompanied by slight deformation, and both accompanied and followed by great erosion. The next and last event was the general elevation, or, perhaps better, series of elevations, which have continued until the present time, restoring to the island the belt of land now forming the fringing coastal border and raising numerous coral reefs above the sea. The latter are now found, in the form of terraces of reef rock, at altitudes of 60, 25 and 15 feet.

The old idea, propounded by Humboldt, and followed in many books to the present day, that the formation of the Rocky Mountains and the Andes was not only contemporaneous, but continuous, is once more attacked by Hill. He points out again the fact that the Central American region shows no connecting ranges, but, on the contrary, east and west trends to the folds, the Central American region being rather a part of the West Indian than of the Andean and Rocky Mountain series. He also controverts the doctrine proposed by Spencer, and which many geologists have considered exceedingly doubtful, that the irregularities of the ocean bottom topography of the great American Mediterranean were due to submerged lands,—a kind of lost continent, an American Atlantis. The facts that Hill brings forward seem to prove conclusively that this topography is not due to erosion, but to orogenic causes.

While the general problem of the relation of Jamaican geological history to that of the entire West Indies is touched upon, it is presumed that Prof. Hill will later develop this relationship much more fully, as his detailed studies, which are still in progress, proceed to the other islands. It is a distinct contribution to the geology of a region hitherto little understood, and is accomplished with a breadth of view which is commendable.

Physiography of Chattanooga District.—The region of the southern Appalachians has been made historic ground to the Amer-

ican physiographer by the work of various members of the United States Geological Survey, particularly Hayes and Campbell. The latest contribution to the literature of this region by Hayes (Physiography of the Chattanooga District, *19th Annual Report United States Geological Survey*, Part II., pages 1–58), after describing the relation of this interesting district to the neighboring country, discusses the rock structure of the district, and follows this by a detailed study of the physiography. In the Chattanooga district Hayes finds evidence of three quite distinct peneplains at different levels. It would be unfair to criticise his discussion of the subject adversely without more familiarity with the district than is possessed by the reviewer, though from the statement of the case in Hayes's paper there seems to be a complexity of physiography which could be more easily explained on the basis of the simpler hypothesis of bevelling. Not only are there level-topped hills, suggesting three peneplain surfaces, but this diversity is still further marked by monadnocks and unakas—a new term, introduced in this paper for the first time, and indicating "a large residual mass in relief above a less advanced peneplain."

After a discussion of the evidence of peneplains, Hayes considers the stream development, explaining in a way which cannot be properly abstracted here the peculiar courses of the Tennessee, Coosa, and tributary streams. One of his conclusions of wide-reaching importance can be stated in the following quotation:

> Effects (upon stream courses) due to difference in rock character and in structure are generally more striking and are first detected, but the broad modifications of drainage are most apt to be produced by the slight warping of the land surface which appears to accompany all uplifts.

It seems questionable whether the application of this principle has been fully recognized in studies of American physiography.

Whether or not one is convinced of the various peneplains which Hayes has attempted to prove, this paper must, from all standpoints, be considered one of the most important contributions to American physiography.

NOTES ON GEOGRAPHICAL EDUCATION.

BY

RICHARD E. DODGE.

CO-OPERATION AMONG GEOGRAPHY TEACHERS. — The recent organization of several co-operative associations among geography teachers in this country and abroad is a healthful sign of the times in the geographical field. When teachers have so far advanced in their conceptions of their geographical needs as to seek aid and advice from their colleagues, it is safe to say that a good, though perhaps a small beginning has been made toward the improvement of geography teaching in elementary and secondary schools.

For several years the physiography teachers in the Chicago High Schools have met regularly to discuss their work and the methods of accomplishing the necessary results. Certain of the grammar school principals of New York City have recently combined in a similar way and have prepared and published a detailed series of suggestions * to teachers of geography in the elementary schools of New York City.

Such organizations are very helpful from an educational and social standpoint, and should be encouraged by all those leaders of teachers and superintendents who do not feel that a text-book needs no amplification or amendments. Organizations that will bring more distant teachers in touch, if rightly conducted, are still more helpful, as there is much less danger of inbreeding in the ideas suggested, and less likelihood of over-emphasis of some one phase of geography teaching—an important point in the elementary field.

For this reason such organizations as the Teachers' Geography Club, of Boston, Mass., and the American Bureau of Geography, of Winona, Minn., ought to be of great value to all who can co-operate in the work.

The Teachers' Geography Club was organized in 1897 by teachers in and about Boston who had received their inspiration from summer work with Professor Davis, of Harvard University. The object of the Club has been to promote a more thorough knowledge of geography, and to secure improvement in its teaching. The

* Suggestions to teachers; in Geography 4^{A}–7^{B}. Privately printed.

Club now numbers about 160 members, of whom several are corresponding members, chosen largely from the well-known geography teachers of the United States.

During the winter months meetings are held for the discussion of geographical matters, and for the presentation of reports of the local committees. For effectiveness, the Club has a committee on pictures, one on books, one on magazines, one on local geography and excursions, and one on lectures.

That the Club considers all phases of geography work is very well evidenced by the following list of excursions that are being carried out during the present season: Excursion to BRIDGEWATER, MASS., morainal deposit, showing fine ice front, morainal beach, esker, natural form, transverse and longitudinal sections; MARBLEHEAD NECK, sea-cutting, cliffs, "The Churn"; GRAIN ELEVATOR, East Boston, a large steamer can be seen while freighting; LYNN WOODS, glacial evidences, "Boulder Path," ledges; ARNOLD ARBORETUM, complex esker and sand plain, an old river gorge and peat bed, adaptation of these features to man's use; ATHENÆUM PRESS, First Street, Cambridgeport, Mass., an opportunity to see how a geography is made from start to finish; KENNEDY'S CRACKER MANUFACTORY AND BRIGHAM'S MILK DEPOT, Cambridge; HARVARD UNIVERSITY, study of geographical equipment; QUEEN QUALITY SHOE FACTORY.

This year, for the first time, the Club is conducting a course of lectures for the benefit of the public and teachers. The subjects and the lectures are indicated in the following list, which will show the character of the work which the Club is trying to do: Prof. Charles E. Fay, The Canadian Alps; Prof. George H. Barton, Hawaii; Dr. William Z. Ripley, Geographical Factors in Human Affairs; Prof. Richard E. Dodge, Colorado Plateaux of New Mexico and their Ancient and Modern Civilizations; Miss Elizabeth F. Fisher, Russia and Its People; Mr. J. B. Woodworth, The Piedmont of Virginia; Dr. Frederick P. Gulliver, Holland; Prof. William M. Davis, The Geographical Effects of Glaciation; Mr. Edward Atkinson, The Physical Geography and Geology of the Cotton Plant; Prof. George L. Goodale, subject to be announced later.

The effectiveness of the Club's work has undoubtedly been largely determined by the fact that the Club has worked together in a small body in such a way as to give mutual and personal assistance. The plan of work that is done, and the scope of the Club's operations, offer valuable suggestions for interested teachers in other localities who desire to club together for mutual assistance.

The President of the Club is Miss Elizabeth F. Fisher, of Wellesley College, Wellesley, Mass.; the Corresponding Secretary is Mr. Philip Emerson, of the Cobbet School, Lynn, Mass.

The American Bureau of Geography is now being organized by Professor Edward M. Lehnerts, of the Normal School, Winona, Minn. The primary aims of the Bureau are: First, to make available to each member the valuable geographical material in the possession of his fellow-members; and second, to establish influences helpful to the teaching and the teacher of geography.

In accordance with this aim, the plan of work of the Bureau includes: Correspondence with educational men and women who are interested in geography and desire improvement in its teaching; organization of a system of exchange of products, geographic views, etc.

In addition to this the Director will publish quarterly a bulletin devoted to helps for the teaching of geography, with the co-operation of Mr. J. P. Goode, of the Normal School, Charleston, Ill.; Mr. C. F. King, of Dearborn School Boston, Mass.; Professor McCormick, of State Normal University, Normal, Ill.; Professor McFarlane, State Normal College, Ypsilanti, Mich.; Mr. J. W. Redway, Mt. Vernon, N. Y.; Mr. Roddy, Normal School, Millersville, Pa., and Professor Tarr, of Cornell University.

The scope of articles announced for the Bulletin is very inclusive, and if the plan is carried out the first number will be large and suggestive.

The plan of the whole Bureau is so very broad that there is danger of a scattering of activities, whereby the best cannot be done in any particular field. There is a chance for great good, if the plan is well conducted, particularly in the exchange of ideas and illustrative materials.

Popular Lectures in Geography in New York City.—Last year mention was made in the *Bulletin** of the attention devoted to geography in the courses of Free Lectures to the People, given under the auspices of the Board of Education for the Boroughs of Manhattan and the Bronx, and under the direction of Dr. H. M. Leipziger, Supervisor of Lectures. Lectures are given regularly at some forty-four different lecture centres, usually to audiences of several hundred. Dr. Leipziger aims to have his lectures practical and helpful, and, so far as possible, arranged in a progressive series. As the audiences, largely composed of working men and

* Bull. Am. Geog. Soc., XXX, 5, 1898, pp. 464–465.

women, who have little time for study and reading, remain very constant in their make-up during the season, the same people often occupying the same seats night after night, the educational results must be very great.

Owing to the stirring events of the last two years there has been a deep interest in geographical topics, and the Supervisor has rightly devoted much attention to topics dealing with travel and descriptive geography. Some 545 lectures are to be given in the courses between October 1, 1899, and March 1, 1900. Of these 135 are announced under the heading of travel and descriptive geography, while many other lectures of a geographical nature are included under Natural Science, etc.

GEOGRAPHICAL PERIODICALS FOR TEACHERS.—The *Zeitschrift für Schul-Geographie*, now in its twenty-first volume, was probably the first special periodical devoted to the interests of geography teachers, but its influence has been very slight in this country. The *Journal of School Geography*, now in its fourth volume, was similarly the first special teacher's periodical in this country, though the host of papers of a local or national character that deal with the problems of elementary school work have long devoted a small portion of their space, mostly at irregular intervals, to the cause of geography teaching. A small paper, aimed to furnish teachers with the latest information in geography, has for two years been published by Superintendent Rupert, of Pottstown, Pa., under the title of GEOGRAPHICAL LEAFLETS. This paper, however, has not dwelt upon the problems of the teaching of geography, being primarily intended to furnish collateral geographical reading for school children.

Recently two new departures have been taken that should aid teachers greatly. The *National Geographic Magazine*, of Washington, D. C., which has hitherto had but an occasional teacher's article, is planning to publish a series of such articles in the near future, getting co-operation from the best-known teachers of geography available. Thus far two articles have appeared, both by Professor Davis, of Harvard University—one in November, 1899, entitled The Rational Element in Geography, and the other in February, 1900, entitled Practical Exercises in Geography, and devoted to the elaboration of practical problems available for elementary and secondary schools.

The latest addition to this branch of educational literature is the promised *Bulletin* of the American Bureau of Geography, already

noted, the first number of which is announced for March. Special emphasis in this paper will not be given to any phase of geography teaching.

A NEW SCHOOL FOR COMMERCIAL GEOGRAPHY.—The increased attention given to commercial geography is not confined to this country. In the last number (January, 1900), of the *Annales de Géographie*, we find note of the recent founding at Lyons of a course planned to prepare young men for public life, to which M. Zimmermann has been called as professor of geography. This movement seems in line with several movements in this country that are now on foot for the opening of university courses planned to fit young men for business and public service.

GEOGRAPHY EXCURSIONS FOR SECONDARY SCHOOLS.—One of the most difficult and unsatisfactory phases of the teaching of geology and physical geography in secondary schools lies in the difficulty of conducting the necessary field excursions. Every one recognizes the need of field work, but, as yet, little has appeared in print that gives practical suggestions to those teachers who are not expert scientists. The Sub-Committee on Physical Geography, of the Committee on College Entrance Requirements of the National Educational Association, lay strong emphasis upon the need of field work, but offer few suggestions, while they give much more detail to the question of laboratory work (see Report of Committee, pp. 159–160).

Tarr* has given a number of suggestions of a general and yet helpful nature, which, however, are of little special assistance to the local teacher. Perry† has shown us clearly how to use the field of the vicinity of Worcester, Massachusetts, in the illustration of more distant and, perhaps, larger areas. The teachers of Chicago are supplied with a very valuable and complete syllabus pertaining to their city.

What is needed for the benefit of local teachers, as the Sub-Committee on Physical Geography has well emphasized,‡ is a series of guides for large cities, which could, perhaps, be used by a considerable number of schools located in a similar region.

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* Suggestions for Laboratory and Field Work in High School Geology, etc., The Macmillan Company, 1897; and Teachers' Outfit in Physical Geography, *School Review*. 1896, Vol. IV, pp. 161 and 193.

† Physical Geography in the High School, *Journal of School Geography*, Vol. III, pp. 130–138.

‡ loc. cit. p. 159.

Next to such local guides, with details of cost, routes, etc., are to be commended such scientific, simple, and readable accounts of a limited area as have lately appeared in reference to Worcester, Massachusetts, and Chicago, Illinois. The first by Mr. Joseph H. Perry* is a well-illustrated, interesting, accurate account of the region mentioned, that deserves wide mention and use. It should be of great value to all geography teachers of southern New England. The second and latest paper of a similar nature appears as Bulletin No. 1 of the Geographic Society of Chicago, and is entitled the Geography of Chicago and its Environs, by Rollin D. Salisbury and William C. Alden. This is a well-illustrated, very pleasing and helpful account of the physical features of Chicago and vicinity that ought to be of great service to teachers. The topography due to structure and to drift is first analyzed, and followed by a detailed account of the development of the topography in recent geological times. With such a guide and a good map the conduct of a field excursion ought to be an easy task, as far as equipment is concerned.

It is to be hoped that local workers in other centres may soon produce guides and local geographical histories that may be of similar service in teaching.

* The Physical Geography of Worcester, Massachusetts, Worcester Natural History Society, 1898.

GEOGRAPHICAL RECORD.

AMERICA.

AGRICULTURE IN ALASKA.—The Department of Agriculture and the War Department explorers have been collecting information with regard to the agricultural possibilities of Alaska.* The testimony of settlers also contributes to establish the fact that Alaska will have considerable development in that line. For 400 miles along the southeast coast, from Prince of Wales Island to Cape Fairweather, the influences favorable to vegetation include fairly abundant precipitation, a temperate climate, due to the Japan current, an unusual amount of summer sunshine and a deep, rich soil. These characteristics, in a lesser degree, are now found to extend 600 miles farther west, beyond Cook Inlet and penetrating inland, in places, at least 125 miles from the coast. Many hundreds of bushels of potatoes and all common vegetables are now raised at Tyoonok and other settlements along Cook Inlet. Lieut. Learnard, Fourteenth Infantry, tells of dinners at Cook Inlet at which everything on the table was raised in Alaska except the flour and butter. Excellent butter is made in the neighborhood of Sitka. Fine oats have been matured at Cook Inlet. The failure of the first attempt to raise wheat there was perhaps due to very late sowing in the fall. The station of the Department of Agriculture at Cook Inlet is continuing its experiments with wheat. Lieut. Castner, Fourth Infantry, says grass is abundant not only in the river bottoms of that region but also above the timber line, and that the bunch grass is especially nutritious. Capt. Glenn's expedition of 1898 reported that along the great valley of the Sushitna river the grass was of fine quality and would support a large amount of stock. The drawbacks to stock-raising are the long winters, which would necessitate curing a great deal of hay, and perhaps the mosquitoes and other troublesome insects. Capt. Abercrombie says the development of agriculture in the Copper River region, farther east, will be conditional only upon finding a market for the produce. Mr. Sittell reports from Copper Centre, 125 miles inland, that practically all vegetables may be raised there. Mr. William Ogilvie, at Daw-

* See "Agricultural Experiments in Alaska," by C. C. Georgeson, M. S.; "Year Book of the Department of Agriculture, 1898;" also "Reports of Explorations in the Territory of Alaska;" War Department, No. XXV., 1899.

son, has estimated the agricultural area of the upper Yukon at about 460,000 acres, but it is probable that the produce of this region will be confined to a few hardier vegetables. It is likely that what is achieved on the extreme northern farming lands of Europe may be done in Alaska. Drainage, transportation and markets will offer serious problems, but Alaska may in time produce all the food required by its inhabitants.

CANADA'S CANALS.—The new locks in the St. Lawrence canals, completed in November last, admit vessels of 270 feet, and the entire system has been deepened to fourteen feet. The steamer *Porto Rico*, 250 feet long, has arrived at New York from the Great Lakes and the St. Lawrence river. Between the Lake Erie entrance to the Welland canal and Montreal there are 84 miles of canals. The remainder is lake and river navigation, where steamers may move at their best speed, and from Montreal there is deep water to the sea. The canals formerly had a depth of only nine feet and their original cost and the later improvements have involved an expenditure of over $60,000,000. The new facilities will augment the commercial importance of Montreal; but if the St. Lawrence canal system is to be made available for the larger lake shipping a vast expenditure will still be required to give the canals adequate depth.

THE FATE OF THE IBARRETA EXPEDITION.—The Argentine newspapers print all the details known of the tragic fate of the expedition led by Enrique Ibarreta, the civil engineer, who set out on May 8, 1898, to descend the Pilcomayo River from its source in the highlands of Bolivia through the plain of the Gran Chaco to the Paraguay. On December 21 two of the party reached Asuncion, seeking relief for the expedition which had surveyed the river for 400 miles and had reached the swamps of Patino, 200 miles above the Paraguay. Their supply of provisions gave out and game was not sufficiently abundant to support the party. The leader sent eight men down the river to procure relief and he and two comrades remained with the boats. The eight men had no food for days, and six of them perished, only two reaching the Paraguay at last in terrible plight. Dr. José Montero was sent up to Pilcomayo with food supplies, and found indubitable evidence that Ibarreta and his two companions had been massacred and their small boats destroyed by Indians. Thus nine of the eleven members of the party perished.

ASIA.

A STEAM ROUTE ACROSS ASIA.—The Siberian railroad was completed on December 28 to Stretensk, 693 miles east of the eastern shore of Lake Baikal. Work on the main line will stop at this point for an indefinite period. Stretensk is on the Shilka river, a tributary of the Amur, and steamboats run in summer from the end of the railroad down the Shilka and Amur to the north end of the railroad which follows the Ussuri river to Vladivostok. Thus by rail and steamer the transcontinental line of communication is now complete from the Atlantic to the Pacific. Not far from Stretensk the line between the Siberian Railroad and Port Arthur is now constructing by the Eastern Chinese Railroad Company, and a branch will connect this line with Vladivostok. It is thus that Vladivostok will first be joined by rail with Moscow, and it is not known when the work of extending the main line beyond Stretensk, which involves very costly engineering, will be resumed. There is a short break in the main line at the south end of Lake Baikal, where the mountains press closely upon the shore, and at present large ferryboats carry trains across the lake to the rails on the east shore.

DEASY'S EXPLORATIONS IN EAST TURKISTAN.—Capt. Deasy, the English explorer, returned to London in December after two years of exploration in almost unknown parts of East Turkistan and Western Tibet, during which he travelled about 5,300 miles. After reaching the headwaters of the Yarkand river he attempted to descend this long and rapid mountain stream, flowing out into the desert, in order to map its unknown parts. Although public orders had been sent to the Chinese officials to give him every assistance, he found that private instructions had been simultaneously issued to impede his progress in all ways, and his first attempt was a failure, though he subsequently completed the exploration of the river by ascending it. Before renewing his work on the Yarkand, however, he went to Polu, near the northern frontier of central Tibet, and made a triangulation across the Kuen Lun range, collecting data needed to determine the height and position of about ninety mountains. He also discovered the source of the Khotan river. Then he carried out his final and successful explorations on the Yarkand, and later undertook further explorations in northwest Tibet, but on account of the hostility of the inhabitants he was compelled to return to India without accomplishing all he had planned to do.

THE NEW HIGHWAY IN PERSIA.—The highway from Resht, on the Caspian Sea, to Teheran, begun by the Russian Government

three years ago, is now completed. Practically all the growing commerce between Russia and Persia passes over the Caspian, and it is expected that the new road will facilitate these trade relations. The *Geographische Zeitschrift* says the road is 217 miles long and great technical difficulties had to be overcome. The Persian Government controls the road and has erected nine stations along the route, where tolls are levied. The Russian officials are permitted merely to see that the road and the telegraph line are kept in repair. It is said the Russians will continue the road to Ispahan.

AFRICA.

COMPLETION OF THE SUDAN RAILROAD.—The first through train between Wady Halfa and Khartum reached the latter city on January 10, and thus steam communication between Cairo and the capital of the Egyptian Sudan is completed. It is not entirely a rail route, for a break in the railroad occurs between the First Cataract at Assuan and the Second Cataract at Wady Halfa, steamboats covering the distance between these towns. From Wady Halfa the rail route strikes straight across the desert southeast to Abu Hamed, on the Nile, and then follows the river to Khartum. The distance by rail and river is about 1,325 miles, of which the railroad from Cairo to Assuan covers 550 miles, the Nile steamers from Assuan to Wady Halfa 200 miles, and the railroad from Wady Halfa to Khartum 575 miles. Khartum may now be reached in three and a half days from Cairo, according to the published time-table, which names thirty-two hours as the time between Wady Halfa and Khartum. The doors of the Egyptian Sudan, which were closed against all the world for over fifteen years, are now opened wide by the completion of this railroad.

FRANCE'S ADVANCE IN THE SAHARA.—In November last the railroad starting from Aïn Sefra, the mountain town in south-west Algeria, was completed about twenty-five miles to the Moghar oasis, on the edge of the desert. This is the first section of the railroad that is to be extended by way of the oasis of Igli to the group of oases at Tuat. The distance from Oran, on the Mediterranean, to Tuat by rail will be about 780 miles. Meanwhile a French force has occupied the important Arab town of Insalah, 100 miles east of Tuat. In this part of the northern Sahara there are three large centres of oases, which France proposes to include in the Government of Oran. The oases of Gurara are the most northern of these groups; about 150 miles south of them is the Tidikelt group, of which

Insalah is the chief town. A little farther to the west is Tuat, the third centre of fertility. France has first established her supremacy in the central group. The three regions are believed to have about 150,000 inhabitants. These oases are of great fertility, but the political value of their subordination to the French régime will outweigh economic considerations. They have been a hotbed of conspiracy against France and the main source of the food supply of the Ahaggar Tuaregs, the most formidable foes of the Europeans in the desert.

THE SUDD IN THE NILE.—The water receipt of the Lower Nile from the great equatorial lakes is at present practically cut off. It takes nearly a year for the water from the central African lakes to reach lower Egypt, and the effect of this failure of supply from the upper river will not be felt by the farmers of Egypt till next spring and summer. The fertilizing quality of the Nile waters is derived from the Blue Nile and the Atbara, coming from the Abyssinian mountains, but a large admixture of White Nile waters is important to give the needed supply for irrigation. Mr. Willcocks, a hydrographic engineer in the service of Egypt, says the reason for the failure of the White Nile supply is that the river and its main tributaries south of 9° N. lat. are blocked by sudd for about 150 miles, and the accumulating flood has poured over the low banks into a vast swampy area, where it has rapidly evaporated. He estimates that it will cost $3,000,000 to do away with the sudd nuisance. His proposal is to dam up the entrance to the side channels, raise the banks of the main channel, and by keeping the waters from the great lakes in one channel he believes they will dispose of any amount of sudd.

COMMERCIAL GEOGRAPHY.

THE LARGEST PRODUCER OF COAL.—In 1899 the United States took its place at the head of the coal-producing countries. For thirty years Great Britain, the United States, Germany and France, the largest producers, have steadily increased their output; but no country has equalled the percentage of increase recorded in the United States, which trebled its production between 1870 and 1895, and has finally surpassed Great Britain by an enormous increase in productivity never equalled before in a single year. The United States output in 1899 was over 244,000,000 tons, which was 49,000,000 more than were mined in the preceding year. This increase in production in one year was greater than the entire average

output of any country in the world excepting Great Britain during the five years 1871–5.

INTERIOR SEA PORTS.—Despatches from Berlin say that the building of the Berlin-Stettin ship canal is now assured, and a commodious harbor is to be built at Berlin. The project of making Brussels a maritime port, by means of a canal from the Scheldt, is already under way. A basin of thirty acres is to be constructed, with a depth of eighteen feet, and commodious wharves will be built. Ghent, the leading industrial city of Belgium, also on the Scheldt, is preparing to accommodate vessels 460 feet in length. A port is also under construction at Bruges, and the short canal connecting the city with the sea at Heyst is to be greatly enlarged.

SKETCH-MAP OF SOUTH-EAST ALASKA.

THE ALASKA BOUNDARY LINE,

AN ADDRESS BEFORE THE AMERICAN GEOGRAPHICAL SOCIETY,

BY

T. C. MENDENHALL,

President of the Worcester Polytechnic Institute.

A few years ago I had the pleasure of addressing the Society upon the Boundary Line separating Southeast Alaska from the British Northwest Territory, calling attention to the ambiguous and uncertain definition of the line in the treaty between Russia and Great Britain, in which it was originally defined, and predicting a controversy, the beginnings of which were even then in evidence. Since then, as everybody knows, this controversy has grown in magnitude and intensity until it has attracted the attention of most intelligent people, and it is everywhere acknowledged to be of such importance as to justify a review of the situation at the present time. As a nation we have often been singularly negligent in the making of treaties involving delimitation of territory, and especially so in our intercourse with Great Britain, with which nation our territorial relations have been most intimate. Up to this time we have shown little, because we have felt little, of that spirit of "hold-fast," which has always characterized the diplomatic policy of the English people. We have been so busy in the occupation and development of the great interior that a few hundred square miles here and there of distant, unsettled regions have seemed to us of little importance. A better understanding on the part of the masses of our people of the interests involved would do much to secure a more vigorous support of just claims on the part of our government authorities; and it is hoped that a dissemination of better information as to the nature of the present dispute will result in a popular demand for a rigid insistence upon those claims. But it must not be assumed that the question of the Alaska Boundary is entirely one-sided. There are serious difficulties in the interpretation of the language of the treaty, and to some of these it will be well to give careful consideration.

It is well known that in the purchase of this territory in 1867 it was conveyed to us in the language of the treaty between Russia and Great Britain, made in 1825. Whatever jurisdiction and rights

we may possibly claim now were those claimed and exercised by Russia from 1825 to 1867—no more and no less.

That part of the treaty which is responsible for the pending controversy is as follows:

"Commencing from the southernmost point of the Island called Prince of Wales Island, which point lies in the parallel of 54° 40′ north latitude and between the 131st and 133d degrees of west longitude (meridian of Greenwich), the said line shall ascend to the north along the channel called Portland Channel as far as the point of the continent where it strikes the 56th degree of north latitude; from this last-mentioned point the line of demarcation shall follow the summit of the mountains situated parallel to the coast as far as the point of intersection of the 141st degree of west longitude (of the same meridian) and finally from the said point of intersection, the said meridian line of the 141st degree, in its prolongation as far as the frozen ocean."

The first apparent difficulty is the determination of what is meant by "the channel called Portland Channel." The Canadians, many of them, have interpreted this to mean that on leaving the southernmost point of Prince of Wales Island the line should be drawn at once to the north as far as the 56th parallel of north latitude, and this carries it to the west of the great Revilla Gigedo Island into Burrough's Bay,* thus throwing that island and a large block of the mainland under their jurisdiction, although now claimed by us. In order to enter what has always been known as Portland Channel it is necessary to proceed from the beginning at Prince of Wales Island straight to the east for about sixty miles, and then "ascend to the north along the channel," which is the line we claim. The omission of a reference to this easterly line in the treaty opens the door for the British contention, and to support it they maintain that the use of the name Portland Channel was an oversight. We contend, on the contrary, that the omission of the fifty or sixty miles of easting from the southernmost point of the Prince of Wales Island is of no special importance, because it would be assumed that before you can ascend along a channel you must get into it.

This point was strongly insisted upon for several years by Canadian authorities, but it has been practically given up as unreasonable and untenable, in the conferences of the Joint Commissioners appointed a year or two ago. A far more serious claim is based on the next phrase of the treaty, which declares that after leaving Portland Channel

"the line of demarcation shall follow the summit of the mountains situated parallel to the coast as far as the point of intersection of the 141st degree of west longitude," etc.

* Or Inlet.

The charts of this region on which the treaty-makers principally relied were those of Vancouver, who explored the northwest coast in the interests of the British Government about one hundred years ago. Vancouver traversed the estuaries and followed the windings of the coast pretty thoroughly, but he did not go inland, all of his work being done, in fact, from the deck of his ship. On his charts a beautifully continuous range of mountains is shown, skirting the coast about 35 miles back from the shore. This range was proposed by the Russian diplomats as a suitable natural boundary. The English, however, were suspicious of the accuracy of Vancouver's map, and were especially concerned lest the range of mountains shown thereon should be found to be really further from the coast than 10 marine leagues. They cited the fact that they had only a few years before encountered difficulty in settling a boundary controversy with the United States, on account of the discovery that mountain ranges shown upon the map did not so exist actually upon the ground. They proposed that the line should be fixed at ten marine leagues, about 35 miles, from the windings of the coast, and it was finally agreed to insert the modifying clause,

"that whenever the summit of the mountains which extend in a direction parallel to the coast from the 56th degree of north latitude to the point of intersection of the 141st degree of west longitude shall prove to be at a distance of more than ten marine leagues from the ocean, the limit between the British possessions and the line of coast which is to belong to Russia, as above mentioned, shall be formed by a line parallel to the winding of the coast, and which shall never exceed the distance of ten marine leagues therefrom."

It is a fact of the utmost importance that the English representatives were willing to accept a line "always at a distance of ten marine leagues from the shore," and that they protected themselves against a possible divergence of the supposed range of mountains to a greater distance inland. The extension of the line to the north along the 141st degree of longitude west of Greenwich is a simple astronomical problem over which there can be no dispute, and so the whole controversy is over the meaning of that part of the treaty which defines the boundary from the point where the Portland Channel meets the 56th parallel of north latitude to the 141st meridian, which it intersects very nearly at the summit of Mount St. Elias. The superiority of English diplomacy is shown in the wording of the treaty so that, while the swinging of the mountain range inland beyond the ten marine leagues shall not carry the boundary line with it, if it should be found to be really less than that distance from the shore, the Russian holdings must be reduced accordingly.

About ten years ago the United States began a survey for the purpose of definitely locating this boundary line. The first work was the establishment of astronomical stations on tributaries of the Yukon, to determine and mark at a few important points the 141st meridian north of Mount St. Elias. About 1891 a survey of the lower part of the region traversed by the boundary was undertaken by the United States and Canada jointly, but it was agreed that the two parties should work independently of each other, so that more ground might be covered, each Government to receive the results of the work of the other. A large part of the work was topographical, especially that of the Canadian parties.

The result of this survey was to prove, at least to the satisfaction of those representing the American side of the controversy, that the range of mountains shown on Vancouver's map does not exist, and that within the prescribed distance of ten marine leagues there is *no* range of mountains in Southeast Alaska "parallel to the windings of the coast." Mountains there are in plenty, but they are scattered about in absolute irregularity, generally increasing in height towards the east, but nowhere simulating a range, except in the northern extremity of the territory under consideration, where is to be found the Fairweather range, and possibly for a short distance in the neighborhood of the White and Chilkoot passes.

The American contention is, therefore, that in view of the failure of the first paragraph in its application to existing conditions, it becomes necessary to fall back upon the second and fix the boundary line at ten marine leagues from the shore, parallel to the windings of the coast.

To this argument Canadians have replied that the phrase "shall follow the summit of the mountains parallel to the coast" is applicable to those mountains which are admitted to be generally but irregularly distributed over the strip of territory in dispute, and that the line should be laid down by joining the summits of those nearest the shore. The effect of the adoption of this principle is to place the line everywhere very near the coast, leaving almost nothing but the western mountain slopes to the United States, and, what is more important, interrupting at several points the continuity of our coast line, giving to Great Britain many important estuaries, waterways and harbors. Indeed, it is clear in all of the negotiations that the primary object of Great Britain is to obtain coast line by which she may control admission to the interior.

Recognizing the difficulty of interpreting this treaty, Americans

have very properly called to their support the doctrine of *vested rights*, accruing from continuous and undisputed and *unmixed* occupancy. Here it cannot be denied that everything is in our favor. From 1825 to 1867 the Russians claimed this territory, as we now claim it, without a word of protest from Great Britain. Not only Russian maps, but *all* maps drawn, up to a very recent time, showed the boundary where we believe it should be. All English charts so represent it. The Hudson Bay Company, an English corporation, leased from Russia a large part of this strip of land, following and adopting the boundary line as now claimed by us, paying an annual rental for its use. Before Parliamentary Committees the territory thus leased was defined and acknowledged by these maps, and in numerous proceedings the Russian claim was admitted without question. Many important points were actually occupied by Russian colonies, and none by British.

After the United States assumed jurisdiction in 1867, the Department of State published a map showing the bounds of the newly acquired territory; many American enterprises were established within the now disputed area, some at the extremest points, all without a word from Great Britain; and there was never an attempt to colonize this region by British subjects. Only a little more than ten years ago, when the value of the mineral resources of the region began to be understood, the first Canadian map was printed showing any other line than that now claimed by us. Even now English maps, almost without exception, show the boundary line as it is found on our own maps, and as late as about a year ago the *Scottish Geographical Magazine*, an acknowledged authority on cartography, published a very complete map of the whole region, with the boundary laid down in agreement with American claims. As to the absolute justice of these claims there can be no doubt in the minds of competent but unbiassed authorities. During the session of the Joint Commission the British Commissioners submitted a proposal to arbitrate the whole question in conformity to the terms of the Venezuelan arbitration, but they declined to consent to the selection of an umpire from the American continent. The American Commissioners proposed to submit the matter to a tribunal consisting of three judges of the highest standing in each country, a binding decision to be reached by at least four of these. This proposition, which must impress all as being eminently fair, was rejected by the British Commissioners, and no further attempt to reach an agreement was made by the Joint Commission.

Through the ordinary diplomatic channels a tentative agreement

has been reached, covering a small portion of the line in the neighborhood of the passes at the head of Lynn Canal, where most conflict of jurisdiction has occurred, and a temporary relief from strained relations is promised. It will be but temporary, however, and it would have been safer and better if the United States had stood squarely for its contention in every detail. If once submitted to arbitration the result would be a compromise, regardless of our real rights, and these are so clear that no concession ought to be made.

MAP NOTICES.

BY

HENRY GANNETT.

Atlas of the State of Pennsylvania, prepared under the direction of Joseph R. Bien, Julius Bien & Company, New York, 1900. Folio II., Plates XLVII., with Index.

As is stated in the title, this atlas has been compiled from the original surveys and various local surveys revised and corrected, the whole structure resting upon the triangulations and surveys of the U. S. Geological Survey, U. S. Coast and Geodetic Survey, U. S. Lake Survey, and the Second Geological Survey of Pennsylvania.

The atlas comprises a large folded map of the United States showing counties, reduced from the nine-sheet map of the U. S. Geological Survey, a large folded map of Pennsylvania, scale 1 inch to 8 miles, a geological map of the State, a relief map, and a map showing mean annual rainfall and temperature. This is followed by statistical diagrams. The body of the atlas is composed of county maps, on a scale of 1 inch to 3 miles, and maps of the largest cities and their environs.

The county maps represent the township, city and borough boundaries, streams and roads, but make no attempt at representing the relief, which, in fact, is too imperfectly known over most of the State to warrant any attempt at its representation.

This is, doubtless, as accurate and complete a representation of the State of Pennsylvania as can be made with our present knowledge of it, and will remain the primary source of geographic information until the completion of the survey of the State by the U. S. Geological Survey.

The engravings, printing, paper and binding are of the best.

THE REPORT OF THE NICARAGUA CANAL COMMISSION has just been issued in the form of a quarto volume of 500 pages, and a portfolio containing 7 maps and 6 profiles.

Map No. I is issued in the form of 4 sheets, sheet No. I being a general map of the Nicaragua Canal region, sheet No. II the geology of the same region, being the same as Map No. I, upon

which geological colors are superimposed; sheets Nos. III and IV represent the rainfall for 1890 and 1898 respectively over the same region.

Map No. II, issued in 3 sheets, shows the projected lines of the canal, upon a scale of 5,000 feet to 1 inch.

Map No. III is issued in 20 sheets, together with an index, and shows the projected lines of the canal on a scale of 1,500 feet to 1 inch, in great detail.

Map No. IV is Greytown Harbor.

Map No. V is the Harbor of Brito.

Map No. VI shows the hydrography of the Caribbean coast from Indio River to the mouth of the Colorado, and

Map No. VII shows Lake Nicaragua with soundings.

The profiles are those of the various proposed routes for the canal and for a railroad across the isthmus.

The work is an important contribution, not only to the immediate purposes of building the canal, but to general geographic information concerning the region.

ACCESSIONS TO THE LIBRARY.

JANUARY–FEBRUARY, 1900.

BY PURCHASE.

Combination Atlas Map of Genesee County, Philadelphia, 1876, 4to; Promenades et Escalades dans les Pyrénées, par Jules Leclercq, Tours, 1877, 8vo; Les Sanctuaires des Pyrénées, traduit de l'Anglais de Lawlor, Tours, 1875, 8vo; Chronicle and Directory for China, Corea, etc., Hongkong, 1893, 8vo; Hongkong Directory and Hong List for the Far East, Hongkong, 1885, 8vo; Selections from Calcutta Gazettes, 1784–1788, by W. S. Seton-Karr, Calcutta, 1864, 8vo; Ancient Cures, Charms and Usages of Ireland, by Lady Wilde, London, 1890, 8vo; Pflanzengeographie auf physiologischer Grundlage, von Dr. A. F. W. Schimper, Jena, 1898, 8vo; Dictionary of National Biography, edited by Sidney Lee, Vol. LXI, London, 1900, 8vo; Europe, the Countries of the Mainland, etc., by Geo. G. Chisholm (Stanford's Compendium, Europe, Vol. I), London, 1899, 8vo; Whittaker's Almanac, 1900, London, 1900, 8vo; Who's Who? 1900, London, 1900, 8vo; The Oxyrhyncus Papyri, Part II (Egypt Exploration Fund, Græco-Roman Branch), London, 1899, 4to; Life in the Wilderness, or Wanderings in South Africa, by Henry H. Methuen, London, 1848, 12mo; The Destruction of Ancient Rome, by Rodolfo Lanciani, New York, 1899, 8vo; The Yangtze Valley and Beyond, by Mrs. J. F. Bishop, New York, 1900, 2 vols., 8vo; Les Anciens Normands chez eux et en France, par Gabriel Gravier, Rouen, 1898, 4to; Historical Index to the Manuals of the Corporation of the City of New York, 1841–1870, New York, 1900, 8vo; Sketches of Brazil, by Robert Dundas, London, 1852, 8vo; Incidents of a Journey through Nubia to Darfoor, by F. Sidney Ensor, London, 1881, 8vo; The Natural History and Antiquities of Selborne, by Gilbert White, New York, 1875, 8vo; In Scripture Lands, by Edward L. Wilson, New York, 1890, 8vo; The Real Malay, by F. A. Swettenham, London and New York, 1900, 8vo; The Great Company (Hudson's Bay), by Beckles Willson, New York, 1900, 8vo; The Life of James Dwight Dana, by Daniel C. Gilman, New York and London, 1899, 8vo; Side Lights on South Africa, by Roy Devereux, New York, 1899, 8vo; Some South African Recollections, by Mrs. Lionel Phillips, London, 1899, 8vo; The Caroline Islands, by F. W. Christian, New York, 1899, 8vo; King Stork and King Log, by Stepniak, London, 1895, 2 vols., 8vo; Historical Guides, Paris, by Grant Allen, London, 1897, 8vo; Historical Guides: Florence, by Grant Allen, London, 1897, 8vo; The Colonies: The Ionian Islands in Particular, by Charles James Napier, London, 1833, 8vo; The Pioneers of the Alps, by C. D. Cunningham and W. de W. Abney, 2nd edition, London, 1888, 4to; The Industries of Russia, edited by John M. Crawford, St. Petersburg, 1893, 5 vols., 8vo; The Jesuit Relations and Allied Documents, edited by Reuben Gold Thwaites, Vols. LIX–LXII, Cleveland, 1900, 8vo; Le Transvaal et l'Angleterre en Afrique du Sud, par Georges Aubert, Paris, (1900), 18mo; Sketches of St. Augustine, by R. K. Sewall, New York, 1848, 8vo; In the Land of Misfortune (South Africa), by Lady Florence Dixie, London, 1882, 8vo; Journal of Voyages and Travels by Daniel Tyerman and George Bennet, etc., in the South Sea Islands, China, etc., Boston, 1832, 3 vols., 12mo; Journal d'un Voyage en Orient, par Joseph D'Estourmel, à Paris, 1844, 2 vols., 8vo; Korea and

the Sacred White Mountain, by A. E. J. Cavendish, London, 1894, 4to; The Seminoles of Florida, by Minnie Moore-Willson, Philadelphia, 1896, 16mo; Life of Jedidiah Morse, by William B. Sprague, New York (1874), 12mo; Atlas of the State of Pennsylvania, prepared under the direction of Joseph R. Bien, New York, 1900, folio; The Puritan in Holland, England and America, by Douglas Campbell, New York, 1893, 2 vols., 8vo; Economic and Social History of New England, by W. B. Weeden, Boston, 1891, 2 vols., 8vo; History and Antiquities of Boston, by Samuel G. Drake, Boston, 1856, 8vo; The Russian Storm-Cloud, by Stepniak, London, 1886, 8vo; Introduction to a Historical Geography of the British Colonies, by C. P. Lucas, Oxford, 1887, 8vo; Historical Geography of the British Colonies, by C. P. Lucas, Vols. 1 and 2, Oxford, 1888, 1890, 8vo; The New Laws of the Indies (with Spanish Text), by Henry Stevens and Fred. W. Lucas, London, 1893, folio; Handbook of the Elements of Place Names in the North-West Provinces of India, by Paul Whalley, Calcutta, 1899, 8vo; Instruccion Reservada que el Conde de Revilla Gigedo, dio a su succesor en el mando, etc., Mexico, 1831, 8vo; A Voyage to East India, etc., by Edward Terry, reprinted from the Edition of 1655, London, 1777, 8vo; The Druzes and the Maronites, 1840–1860, by (C. H.) Churchill, London, 1862, 8vo; A Residence in Jutland, the Danish Isles and Copenhagen, by Horace Marryat, London, 1860, 2 vols., 8vo; Constantinople, by Edmondo de Amicis, translated by M. H. Lansdale, Philadelphia, 1896, 2 vols., 8vo; Last Winter in the United States, by F. Barham Zincke, London, 1868, 8vo; The Baths and Wells of Europe, by John Macpherson, London, 1869, 8vo; Our Baths and Wells, by John Macpherson, London, 1871, 8vo; A Dictionary of Place-Names, by C. Blackie, London, 1887, 8vo; Romantic Spain, by John Augustus O'Shea, London, 1887, 2 vols., 8vo; History of Yonkers, by Charles E. Allison, New York (1896), 4to; From Pharaoh to Fellah, by C. F. Moberly Bell, London (1887), 4to; A Residence among the Chinese, by Robert Fortune, London, 1857, 8vo; Indian Myths, by Ellen Russell Emerson, London (1884), 8vo; Les Ecossais en France et les Français en Ecosse, par Francisque-Michel, Londres, 1862, 2 vols., 8vo; On the Broads, by Anna Bowman Dodd, London, 1896, 8vo: The Danube, by F. D. Millet, New York, 1893, 8vo; Old Deccan Days, by M. Frere (reprint), Albany, N. Y., 1897, 8vo; Scribner's Popular History of the United States, Vol. V. (supplementary volume of Bryant and Gay's History), New York, 1899, 8vo; The American in Holland, by William Elliot Griffis, Boston, 1900, 8vo; The European Tour, by Grant Allen, New York, 1899, 8vo; About the Weather, by Mark W. Harrington, New York, 1899, 8vo; Volcanoes, their Structure and Significance, by T. G. Bonney, New York, 1899, 8vo; The Florida of To-day, by James Wood Davidson, New York, 1899, 16mo; The Pilgrim Fathers, Exhibition of Documents at Leiden, etc., Leiden, 1888, 16mo; The Old Stadt Huys of New Amsterdam, by J. W. Gerard, New York, 1875, 8vo; Historia Geográfica, Civil y Politica de la Isla de S. Juan Bautista de Puerto Rico (Iñigo Abbad), Madrid, 1788, 4to; The Forgotten Isles: Balearic Isles, etc., Gaston Vuillier, New York, 1896, 8vo; Soldiering and Surveying in British East Africa, by J. R. L. Macdonald, London, 1897, 8vo; America in the East, by William Elliot Griffis, London, 1899, 8vo; An Eclipse Party in Africa, by Eben J. Loomis, Boston, 1896, 8vo; Elements of Geology, by Joseph Le Conte, 4th edition, New York, 1899, 8vo; A Political History of Europe since 1814, by Charles Seignobos, translation edited by S. M. Macvane, New York, 1900, 8vo; Russia in Asia, 1558–1899, by Alexis Krausse, New York, 1899, 8vo; Geologische Studien in der Republik Colombia, II, Petrographie, 2., W. Reiss und A. Stübel, Reisen in Süd-Amerika, Berlin, 1899, 4to; History of the Great Boer Trek, by Henry Cloete, London, 1900, 8vo; Antiquities of Long

Island, by Gabriel Furman, edited by Frank Moore, New York, 1874, 12mo. Publications of Societies, New York, 1899, 8vo; Report of the Nicaragua Canal Commission, 1897–1899, Baltimore, 1899, 1 vol., 4to and portfolio.

GIFTS.

From Anthony J. Drexel-Biddle, Author:

The Madeira Islands. London, 1900, 2 vols., 8vo.

From Émile Cammaerts, Translator:

Formation des Dunes de Sable, par Vaughan Cornish. (Article paru dans le numéro de Mars, 1897, du "Geographical Journal.") Traduit de l'Anglais par E. Cammaerts. Bruxelles, 1900, 8vo.

From Miss Cornelia Horsford, Author:

Vinland and its Ruins: Some of the Evidences that Northmen were in Massachusetts in Pre-Columbian Days. 1899, 8vo. (Reprint.)

From the Trustees of the Public Library, Museums and National Gallery of Victoria, Melbourne:

Letters from Victorian Pioneers: A series of Papers on the early occupation of the Colony, the Aborigines, etc., edited by Thomas Francis Bride, LL.D. Melbourne, 1899, 8vo.

From George H. Pepper, Author:

Hyde Expedition, Ceremonial Deposits found in an ancient Pueblo Estufa in Northern New Mexico, U. S. A. New York, 1899, 8vo. (Reprint.)

From Professor G. Schlegel, Author:

Geographical Notes, No. XIII. Reprinted from T'oung Pao, Vol. X, No. 5. Leyden, 1899, 8vo.

From the Société d'Ethnographie, Paris:

Archives de la Société Américaine de France, Nouvelle Série, Tome 1er. Paris, 1875, 8vo.

From the Université Laval, Québec:

Noëls Anciens de la Nouvelle-France: Etude Historique, Ernest Myrand. Québec, 1899, 8vo.

BOOK NOTICES.

The International Geography. Hugh Robert Mill, Editor. D. Appleton & Company, New York. 8vo, 1089 pp., 487 figures in the text.

This important handbook of geography is prepared by seventy authors under the general editorship of Dr. H. R. Mill, Librarian of the Geographical Society of London. The ten chapters of Part I deal with the principles of the science. Among the authors are Dr. J. S. Keltie, Dr. John Murray, Dr. J. W. Gregory, and the Editor. The subjects treated are: Mathematical Geography; Maps; The Plan of the Earth; Land-Forms; The Oceans; The Atmosphere and Climate; The Distribution of Living Creatures; The Distribution of Mankind; Political and Applied Geography.

The bulk of the volume is devoted to regional geography, and is prepared by experts in their respective fields. Thus, the United Kingdom is treated by Dr. Mill, the physical geography of France by Professor A. de Lapparent, and Austria by Professor Penck. Continental summaries precede the accounts of the several countries. Thus, North America is described as a whole by Professor W. M. Davis; while Canada is taken by Mr. J. B. Tyrrell, the United States by Professor Davis, Mexico by Professor A. Heilprin, and Cuba and Porto Rico by Mr. R. T. Hill. The continent of South America is described by Dr. A. J. Herbertson, of Oxford; Ecuador, Peru and Bolivia by Sir Clements R. Markham, and the Arctic regions by Nansen. Thus we have sufficient indication of the character of the work. Compact statistics and a bibliography close each chapter, and a copious index closes the volume. The illustrations consist largely of sketch maps of physical and political features.

With this brief notice of the general plan, our review must limit itself to some of the chapters upon North America. Professor Davis' account of the continent is short, but discriminating. The homologies of North and South America and of our continent and Eurasia are recognized and rationally stated, but we are put upon guard against resemblances that are fanciful. The contrasts are not neglected. The physical features—such as the shore-lines, the Laurentian and Appalachian Highlands, the Rocky Mountains, etc.—are genetically described, and climate is illustrated by temperature

and rainfall maps, followed by notices of the aboriginal people, of the history of settlement and of territorial growth.

In the account of the United States the same author gives us the longest chapter in the book, and the Editor characterizes it as perhaps the most instructive, by virtue of its novel and scientific plan. Reference is here had to the methods of the new geography, which are freely used. The country is subdivided into physical districts rather than into States, which latter often have no physical unity. Thus the Appalachians are parcelled out among many States, and a State like New York is composed of mountain, plateau and plain. The diversity of State legislation is illustrated in the brief notice of our political system, and there is a judicious reference to the effect of excessive immigration upon our municipal life. Equally just reference is made to the value of our scientific bureaux, and to the character and generous distribution of their reports.

The chapter deals mainly, however, with regional geography. Among the noteworthy illustrations of the genetic method we find here the origin of Appalachian topography as now understood. The stages of this history have now become familiar to many students of geography. They are, in brief, very ancient making of high mountains; denudation nearly to sea-level, forming a peneplain, subsequent uplift to plateau altitudes, the plateau carrying Monadnock remnants and being deeply dissected in a new geographic cycle. The contrast between our northern and southern Atlantic shore-line is strikingly shown, due to submergence at the north and the emergence of marginal sea-bottoms at the south. The various features of this shore-line have determined the first settlements and the relative growth of the colonies. A characteristic passage is the explanation of such "cusps" as Capes Hatteras, Fear and Lookout, as "due to the interaction of several large back-set eddies of the long-shore waters, which seem to turn in local circuits between the Gulf Stream and the continent."

The lowland coastal areas of New England have been formed by the etching out of weak rocks, with submergence. Hence have arisen Boston, Providence and the cities of the Connecticut Valley. Water-power has mainly shaped the industry of New England, and this in turn is due to the glacial renewal of the topographic youth of the region. Following this principle of geographic control we understand the commercial superiority of New York. The middle of the older Appalachian belt of mountains is much submerged, and hence is crossed by the deep navigable channel of the Hudson;

while the Mohawk Valley offers the only deep-cut passage across the plateau that stretches from the Adirondacks to Alabama. In contrast, the Potomac has been "drowned" only up to Washington, but not across the old belt of hard rocks at Harpers Ferry, and there is no passage like that of the Mohawk across the plateau. Hence Norfolk could not have become a rival of New York. The interesting point is brought out that Philadelphia, which is also due to a depression in the edge of the continent, has expanded on open ground, and has, therefore, a large proportion of its families in individual homes.

Equally significant is the unification and swiftly developing Americanism of great and diverse populations on the broad prairies of the Mississippi Valley. The lakes and the railroads are the chief instruments in this growth. Of the latter the author writes, "Distance is their only obstacle, and that they overcome by building single tracks; they have few cuttings or embankments; they cross each other on the level, and gather in tangled ganglia in many prairie centres like Columbus, Indianapolis and Springfield." In contrast to the immense importance of railways, the Mississippi River has lost its former commercial significance, and is an impediment in transcontinental traffic. The comparatively uniform excellence of the soil in the glaciated parts of Ohio, Indiana and Illinois is set over against the sudden contrasts south of the glacial belt, where the soil depends on the underlying rocks. Thus the Blue Grass region of Kentucky adjoins the barren sandstone uplands of that State.

A short but most effective summary of the geographic factors in the astonishing development of Chicago is given. The immediate site is poor ground for a great city, but it is "the point where all overland travel from the east must turn around the southern end of Lake Michigan on the way to the great North-West." An interesting abstract is given of the newly-worked-out history of the glacial Great Lakes in their relation to Niagara. It is perhaps too brief to be well understood by the general reader, but may well arouse his curiosity to know more of a most remarkable physical history which has profoundly influenced the development of the United States and Canada. Another product of recent observations is the post-glacial diversion of much of the drainage of Western Pennsylvania, and probably even of West Virginia, from the Erie to the Ohio basin. The cities of the Mississippi River are cited as illustrations of geographic control. New Orleans is upon the lower part of its flood-plain. Memphis, Vicksburg, Natchez and Baton Rouge are

at points where the river swings against its eastern bluffs. Cairo is at the entrance to the Ohio, St. Louis at the head of the flood-plain, St. Paul at the head of navigation, and Minneapolis where the Falls of St. Anthony afford water-power. The States west of the upper Mississippi are remarkable for their well-displayed and well-differentiated sheets of glacial drift. This is one of several sections in which the geographic importance of glaciation receives emphasis. Equally good exposition is given of typical areas in the Far West. Among these are the Bad Lands, the Rocky Mountains, the Colorado Plateaux, the Columbia lava plateaux, the Basin Ranges, and the Pacific Slope. The writer of this review does not hesitate to characterize this chapter as the best short account of the United States which can be found.

Space will admit of but brief reference to Mr. Tyrrell's instructive sketch of the British parts of our continent. This author has traversed widely the lesser-known parts of this northern empire as a member of the Canadian Geological Survey. The average population of Canada is less than one and a half per square mile. Most of the five millions of people are in the four south-eastern provinces. Nearly two and one-half millions of miles of northern and western territory had in 1891 less than one hundred thousand residents. The effect of environment is seldom better shown than in the fact that 14,000 boats and 27,000 men of Nova Scotia are busy with fisheries. Prince Edward Island is but one-tenth as large as Nova Scotia, but is more closely peopled than any other province of the Dominion, having 54 inhabitants to the square mile. The single province of Quebec is nearly as large as France and Germany combined. In the section on Ontario a fact is stated which is of equal or greater meaning to the United States—that a larger tonnage passes the "Soo" than goes through the Suez Canal. The contrast is well brought out between the mining provinces of the Laurentian Highlands and the great agricultural province of Manitoba, much of which is the floor of a glacial lake. An interesting contrast appears in British Columbia, which has interior regions too dry for tillage without irrigation and a coastal tract which is too wet for agriculture. A short section is devoted to Newfoundland, and a paragraph to St. Pierre and Miquelon, which are of interest as the sole remnant of French possessions in North America.

The International Geography is not exhaustive, like an encyclopedia; it is not an atlas, but it is modern, replete with information, and will be a valuable helper upon the student's table.

A. P. B.

About the Weather. By Mark W. Harrington. 12mo. New York, D. Appleton & Company, 1899. pp. 246. Illustrated. Price 50 cents.

This little book may be recommended to those who wish to learn something about the larger relations of meteorological phenomena. *About the Weather* is not at all adapted for use as a text-book, but is intended for "home reading." The author, Professor Harrington, is well and favorably known as a representative American meteorologist. With the exception of the first four chapters, which concern some of the more important of the human relations of meteorological phenomena, the book presents little that calls for comment. In general, the treatment of the subject is similar to that in other books of the same kind. The four chapters referred to are, however, somewhat unique in laying proper emphasis upon a very important aspect of meteorology. The relations of climate, and of weather changes, to man are many and varied. They have not begun to receive the attention which they deserve. It is, therefore, a promising sign when the author of the latest book on meteorology places the human relations of his science so prominently in the opening chapters of his book. *About the Weather* will give any one a pleasant hour or two of interesting and profitable reading.

R. DEC. W.

The Madeira Islands. By Anthony J. Drexel Biddle, Fellow of the American Geographical Society; Delegate, by Special Appointment, of the Associação Commercial of Funchal, Madeira, to the International Commercial Congress in Philadelphia, U. S. A., 1899, etc., etc. With Forty-seven Full-page Illustrations, a Map of Funchal, and a Section of the Medici Map, and Comprising the History of the Madeiras; Information for the Traveller and Visitor; a Treatise descriptive of the Natives, their Characteristics, Religions, Laws, and Customs; and an Account of the Commerce. Two Volumes, 8vo. London, Hurst & Blackett, Limited, 1900.

In these handsome volumes Mr. Drexel Biddle has condensed and classified the results of his long acquaintance with the Madeira Islands and their people, who seem to have won his affection. He says in his preface:

> In styling the natives of these islands Madeirans the author has furthermore departed from the custom of all previous writers on the subject, who have called them Portuguese—an appellation which the natives themselves resent.

No explanation was needed; the people of Madeira are Madeirans, and they are so called by the Portuguese. None the less they are also Portuguese, resent the appellation as they may. Exaggerated self-consciousness like theirs is the mark of small communities all over the world. "As Hull goes, so goes the State."

Mr. Biddle accepts as historical the charming legend of the lovers who discovered Madeira. The story would lose nothing, but it would gain very little, if it were recognized as authentic history to-day, to be relegated to the land of fable in a few years. As romance it is sure of perennial youth.

The ways of life, the street scenes in Funchal, the social aspects, the excursions and the natural beauties of the islands are, in a measure, reduced to tabular form by the author, so that his book might serve as an illustrated Baedeker. The statistics given are fortified by official documents and letters.

The maps and the numerous views are excellently reproduced.

OBITUARY.

William Henry Gilder.

Mr. Gilder died on the 5th of February at his home in Morristown, New Jersey, in his sixty-second year.

He was born in Philadelphia, but early in life removed to New York, where, at the outbreak of the Civil War, he enlisted in the Fifth Regiment N. Y. Volunteers. He was afterwards transferred to the Fortieth Regiment, and served until the close of the war with the Army of the Potomac.

He was commissioned captain and was brevetted major in 1864 for "gallant and meritorious services." He was wounded both at Fredericksburg and Gettysburg.

After the war, he was at one time the managing editor of the Newark (N. J.) Register.

Quiet and undemonstrative in manner, Mr. Gilder was full of daring and hardihood, and of an adventurous spirit.

In 1878 he joined the Franklin Search Expedition, as second in command under Lieut. Schwatka. This expedition recovered many of the relics of Franklin's party, and made a memorable sledge journey of more than three thousand miles.

In 1881 Mr. Gilder went with the *Rodgers* in search of the *Jeannette*, and, when the *Rodgers* was burned, he made a journey across Siberia to telegraph the news to Washington, and then took part in the search in the delta of the Lena for the survivors of the wrecked *Jeannette*.

Mr. Gilder accompanied the French army in Tonkin as a war correspondent in 1883, and after his return to America devoted himself to newspaper work.

He published in 1881 his account of *Schwatka's Search*, and in 1883 the story of his Siberian journeys, under the title of *Ice-Pack* and *Tundra*.

NOTES AND NEWS.

THE OFFICIAL *Bericht* of the Seventh International Geographical Congress prints the following Resolutions, in addition to those published in BULLETIN No. 5, 1899:

OCEANOGRAPHY.—The Congress considers the Resolutions of the Conference on International Oceanographical Research, held at Stockholm in June, 1899, to be so important for the advancement of Oceanography in general, that it desires to make to the Governments represented at that Conference an urgent appeal that these Resolutions should be carried out in their entirety.*

MAPS OF PREHISTORIC REMAINS.—The Congress considers it highly desirable that maps should be constructed showing the distribution of the dwellings and burial-places of the so-called prehistoric peoples, with the greatest possible amount of discrimination of the respective periods of the remains. It directs the attention of the approaching Archæological and Prehistoric Congress, to be held in Paris in 1900, to this question, and relegates to that Congress the appointment of an International Committee on the subject.

Proposition to be amended at the next Congress:

TRANSSCRIPTION OF NAMES.—The Congress expresses the desire that the question of the transscription of place-names should be brought up for consideration at the next Congress.

THE LIST OF INTERNATIONAL CONGRESSES to be held during the Paris Exposition, this year, numbers 106. Those more or less directly related to Geography are the Congress of Mountaineering, the Congress of Americanists, the Colonial Congress, the Congress of Ethnographic Sciences, the Congress of Economical and Commercial Geography, the Geological Congress, and the Congress of Colonial Sociology.

THE CATALOGUE OF PERUVIAN EARTHQUAKES, begun in the *Boletin* of the Lima Geographical Society, Tomo VIII, Trimestre Tercero, is concluded in Tomo IX, Trimestre Primero.

The catalogue begins with the year 1513, and is brought down to 1878, and it notes more than 2,500 earthquakes, 215 of which occurred in the sixteenth century, 27 in the seventeenth, 852 in the eighteenth and 1,452 in the nineteenth. It is evident that there was no attempt at careful registration of these phenomena before the year 1700, and such records as exist must he sought for, ac-

* The Conference referred to assigned to the nations bordering the Baltic, North and Arctic Seas areas for simultaneous investigation of the waters at the beginning of February, May, August and November, at which periods the greatest changes take place in the waters. The Governments represented were: Finland, Russia, Germany, Sweden, Denmark, Norway, The Netherlands and Great Britain.

cording to Señor Polo, who compiles the catalogue, in rare or even in unpublished works on various subjects, in the chronicles of religious bodies, in the lives of holy men, and in theological or literary treatises.

With regard to the frequency of shocks, Señor Polo quotes the statement of Father Cobo, in the middle of the sixteenth century, that no year passed without an earthquake in Peru and Chile, and the calculation made by Dr. Fuentes, that in the period between 1815 and 1858 there were eight more or less violent earthquakes every year in Lima. This city and Arequipa seem to be the principal centres of activity—the former with a record of 923, and the latter with one of 1377 convulsions.

NEARLY ALL THINGS ARE OLDER than they seem to be. The *Bulletin* of the Paris *Société de Géographie Commerciale* (Vol. XX, p. 674) discovers that commercial geography, regarded by many as a recent creation, was cultivated by at least one original mind in the eighteenth century. There is no resisting the evidence of this quotation from the sign of a barber-surgeon of the time:

I teach joggraphy and foreign merchandise every Wednesday and Friday. With the help of God, by me, Isaac Macaire.*

Genius is hereditary in the Macaire family, and Isaac, not content with teaching commercial geography, seems to have preceded the National Educational Association in the flowery path of spelling reform.

THE IMPERIAL UNIVERSITY OF TOKYO prints in the *Journal of the College of Science*, Vol. XI, Part IV, the Catalogue of Japanese Earthquakes between the years 416 and 1867, compiled under the superintendence of the late Prof. S. Sekiya. Counting as one each great earthquake with its after-shocks, the number during the 1451 years amounted to 1898.

Dr. F. Omori, in his Notes on the Catalogue, recognizes three classes of earthquakes:

1.—*Great* or *destructive*, in which the ground was cracked, buildings greatly damaged, lives lost, etc.;

2.—*Strong*, in which slight damage was caused, such as cracks in walls, etc., and people were alarmed;

3.—*Small* or *slight*, in which the motion was felt, without resulting alarm or damage.

* J'enseigne Joggraphy et marchandises étrangères tous les mercredi et vendredi. Dieu aidant, par moi, Isaac Macaire.

Dr. Omori counts two hundred and twenty-two destructive earthquakes in Japan to the end of the year 1898.

He regards the earlier records as imperfect, but relies upon the accuracy of those from the beginning of the seventeenth century to the present time, and he calculates that for the 299 years ending with 1898 there were in Japan one hundred and eight destructive earthquakes, or one in about every 2½ years.

He finds that the provinces on the Japan Sea, or concave side of the arc formed by the islands of the empire, have been disturbed almost exclusively by *local* shocks; while those on the convex, or Pacific side of the arc, often suffered great *non-local* shocks, originating in the ocean and sometimes accompanied by fearful sea-waves.

Kyoto, the capital for 1070 years, from 797 to 1867, has a record for that period of 1,308 earthquakes, 34 of which were destructive. Two of these sometimes happened in one year, and there have been intervals of 50 and 100 years without one.

Dr. Omori's Notes are illustrated by 23 analytical tables and 12 plates of seismic frequency and distribution.

TRANSACTIONS OF THE SOCIETY.

JANUARY–FEBRUARY, 1900.

The Annual Meeting of the Society was held at Chickering Hall on Monday, January 22d, 1900, at 8.30 o'clock P.M.

The chair was taken by Vice-President Moore.

Seats on the platform were occupied by members of the Council and by the following invited guests: Hon. Abram S. Hewitt, Hon. Joseph F. Daly, Hon. Geo. C. Barrett, Mr. John E. Parsons, Mr. Paul B. Du Chaillu,

Hon. Morgan J. O'Brien, Mr. B. Moynahan, } representing the Friendly Sons of St. Patrick;

Mr. Stephen M. Wright, " Douglas Taylor, " John H. Waydell, } representing the General Society of Mechanics and Tradesmen;

Hon. Addison Brown, " Seth Low, Mr. D. O. Mills, } representing the New York Botanical Garden;

Dr. H. H. Rusby, " T. F. Allen, Prof. N. L. Britton, } representing the Torrey Botanical Club.

The following persons, recommended by the Council, were elected Fellows:

J. Wheeler Hardley,	Henry Van Holland,
C. W. Haskins,	Frank Lyman,
Richard A. Hudnut,	Nikola Tesla,
Theodore W. Moses,	Fordham Morris,
Aymar Embury,	Jeremiah Evarts Tracy,
C. G. Crawford,	George Turnure,
Wm. C. Le Gendre,	W. D. H. Washington,
F. G. Goodrich,	Edward H. Cole,
Albert Delafield,	John Henry Timmerman,
Edward Harding,	Wm. Paul Gerhard, C.E.,
F. Benedict Herzog,	Morris Loeb,
Roswell Eldridge,	W. J. Bormay.

The Annual Report of the Council was presented and read:

NEW YORK, January 6, 1900.

To the American Geographical Society:

The Council respectfully submit the following report for the year 1899:

The number of Fellows on the 1st of January was 1,179. The additions during the year number 68. The losses by death, resignation, etc., were 83, and the total

Fellowship on the 31st of December was 1,164, of which number 297 were Life Fellows.

The additions to the Library number 3,588, viz.: Periodicals and Pamphlets, 2,465; Books, 853; Maps and Charts, 258; Atlases, 12. Among the acquisitions may be mentioned the Report of the Intercontinental Railway Commission, in seven volumes, quarto; the continuation of Lanciani's great topographical map of Rome, and a set of Zeiller's Topographies, in 11 volumes, folio.

On the 1st of December the Council received an excellent portrait of our late President by Harper Pennington, a present to the Society from a number of subscribers.

For the condition of the finances reference is respectfully made to the report of the Treasurer, herewith submitted.

The Council, deeply impressed with a sense of the insecurity of the valuable library and collections in the present home of the Society, and convinced that the necessity of the case called for action, issued in February last a circular letter to the Fellows, setting forth the facts and inviting contributions to the Building Fund.

In response to this appeal the following subscriptions were received:

Joseph Loth	$250.00
William A. Du Bois	250.00
Herman O. Armour	1,000.00
Rev. E. A. Hoffmann	250.00
Herman C. von Post	1,000.00
Seth Low	250.00
Chandler Robbins	1,000.00
Rev. D. Stuart Dodge	200.00
George Watkinson	100.00
Henry Parish	5,000.00
James J. Higginson	250.00
James J. Hill	100.00
John D. Archbold	1,000.00
Morris K. Jesup	1,000.00
James B. Ford	2,500,00
Anton A. Raven	1,000.00
William C. Schermerhorn	1,000.00
John A. Hadden	1,000.00
Walter R. T. Jones	250.00
D. O. Mills	5,000.00
William C. Whitney	250.00
Gustav E. Kissel	500.00
Chas. P. Daly	5,000.00
Francis M. Bacon	1,000.00
Moses Pierce	300.00
Amounting to	$29,450.00*

These subscriptions, though generous in individual amounts, were in the aggregate disappointing, and it is hoped that others may yet be received.

The Council proceeded, however, to purchase two lots of land, each 25 x 102 feet,

* Since the Report was made, a subscription of $250 has been received from Mr. James Douglas.

in West 81st Street, facing Manhattan Square, which were held, after mature consideration, to be in every way most desirable for the purposes of the Society.

Plans for a new building have been drawn by the architects, Messrs. Howells and Stokes, and are being carefully studied by the Council; the problem being how to construct, with an inadequate fund and without incurring indebtedness, such a building as shall meet our requirements for the future as well as for the present, and constitute, at the same time, a worthy addition to the noble edifices of the city.

The lots have been excavated for the foundation, and it is expected to begin the work of construction in the spring of this year.

All of which is respectfully submitted.

HENRY PARISH,
Chairman.

LEVI HOLBROOK,
Secretary.

The report of the Treasurer was then presented and read:

AMERICAN GEOGRAPHICAL SOCIETY.

GENERAL ACCOUNT.

REPORT OF THE TREASURER FOR THE YEAR 1899.

The Treasurer respectfully reports that on January 1st there was in Union Trust Co.		$1,982 13
During the year there have been received from Fellowship Dues, Sales of Publications and interest on invested funds		17,826 29
		$19,808 42
There have been expended for salaries, Library, Publications, Meetings, House a/c, Explorations, Insurance, Postages, &c., &c.		12,423 34
		$7,385 08
There have also been received from Sales of investments	$59,700 00	
Donations to Building Fund	29,450 00	
		89,150 00
		$96,535 08
And there has been paid for two lots on West 81st Street, and for taxes and charges thereon		91,380 81
On December 30 there are in Union Trust Co.		$5,154 27

WALTER R. T. JONES,
Treasurer.

NEW YORK, December 30th, 1899.

The Committee charged with the duty of selecting candidates for the offices to be filled, made the following report:

To the Council of the American Geographical Society:

The Committee appointed to recommend to the Society suitable persons to be elected in January, 1900, to fill vacancies now existing and then occurring in the offices, respectfully reports:

That as a tribute of respect to the memory of Judge Daly, it asks leave to defer

for the present any recommendation to fill the office of President, left vacant by his death : and

It recommends the election of the following-named persons to the offices designated :

W. H. H. MOORE—for Vice-President, term to expire in January, 1903.

PROF. W. LIBBEY—for Foreign Corresponding Secretary, term to expire in January, 1903.

WALTER R. T. JONES—for Treasurer, term to expire in January, 1901.

FRANCIS M. BACON,
JOHN GREENOUGH,
ALEXIS A. JULIEN,
S. NICHOLSON KANE,
D. O. MILLS,
} for Councillors, terms to expire in January, 1903.

HENRY PARISH, Chairman,
CHANDLER ROBBINS,
LEVI HOLBROOK,
Committee.

NEW YORK, January 6, 1900.

It was moved and seconded that the Chairman should name one Fellow to cast the vote of the Society for the candidates, and the Chairman named Mr. A. A. Raven, who cast the vote accordingly, and the candidates were declared duly elected.

The Chairman then announced that the Annual Meeting had been selected as an appropriate occasion for the commemoration of the life and services of the late President of the Society, Charles P. Daly, and added :

One or two facts, within my own knowledge, briefly stated, may interest you.

Fifty-six years ago it was my privilege to see him presiding as Judge in the Old City Hall. He was a young man, of slender form, and it was well known that his opportunities for preparation had been very limited. Some of the older lawyers looked upon him with grave apprehensions as to his success. His tireless industry, energy and perseverance soon put at rest their fears.

About ten years after his appointment as judge he joined this Society for recreation and pleasure. His long walks, between his home and the Court room, gave him exercise, health and vigor, and as I have heard him state, a good old age. In his leisure hours he took great delight in geographical studies. He little imagined that he would attain a world-wide distinction as a geographer. This Society at that time was very small. The eloquent Dr. Hawks, George Bancroft and Henry Grinnell were among its prominent members.

As to Judge Daly's amiability and good temper I may state that in one of his judicial decisions he spent much time and thought in writing an opinion. It was on an important commercial question, and was considered so able and excellent that copies of it were printed in pamphlet form and widely circulated. Unfortunately the decision was reversed by the highest Court in the State. Sincere regrets were expressed to Judge Daly that so valuable a decision, supported by such clear and conclusive reasoning, should go for nothing. He said he made it a point not to have any feeling over such a result, and he uttered these words with much gentleness and equanimity. I am bound to say that two of the ablest Judges of that highest Court, one from New-

York and one from Brooklyn, agreed with Judge Daly and wished to sustain his decision.

Judge Daly in the closing years of his life was so well known as an authority in geographical science, and was so highly respected, that a letter of introduction from him to the leading Geographical Society of the world—I refer particularly to the Royal Geographical Society of London—would secure to the bearer all the consideration and attention he could reasonably desire.

The Chairman then introduced Prof. William Libbey, who spoke as follows:

Nations magnify their heroes, and communities their faithful citizens. We meet to-night to express our veneration for a well-spent life, and I appear before you out of esteem for Judge Daly, and respect for your request that I say a few words concerning his life and work in connection with this Society.

Whenever death occurs there comes a break in the course of our thoughts, which causes a solemn feeling to take possession of us. That wondrous veil which separates us from what is beyond checks even our spirit's flight as with a sword's keen tip. We may have walked in closest and kindliest intercourse with our friend up to this point, but here the way is barred, and the unaided human eye, peering out into the darkness, feels no responsive ray of light.

The longer the friendship has lasted, the deeper the meaning of fellowship, the richer the life, the greater does the void appear; and the chill of that fathomless ocean of the unknown strikes us back with a sigh upon its shore,—no matter how deeply we realize that it is not the barrier, but the gateway to eternity and immortal life.

That a man should rise from the ranks to eminence, in this country, is no new thing, but such development usually takes place along some single line. How often is it true that the broader elements, known as the humanities, are lacking in such growth!

I shall leave the story of the youth, the early struggles, and the success which crowned the efforts of Charles P. Daly in his chosen profession to abler lips than mine. It is my duty to give you a glimpse of his character from another standpoint,—that of the scientific man.

The hardships of poverty, and the roughness of the forecastle, may make a "man" out of good material, but do they always produce a scholar or a polished gentleman,—a friend of great men, the associate of men of letters? Neither do they always produce a geographer; but I do not hesitate to say, that in this particular case they may have excited the curiosity first, and then the profounder interest which characterizes the true student of nature. Judge Daly had certainly cultivated all the virtues of a man of science, which find their highest reward in the possession of truth. He was an ardent and devoted lover of nature, and this craving for truth, which made him modest in his opinions and cautious in his statements, pervaded his character like the breath of life.

He was full of enthusiasm, even in his old age, over each new discovery, and every advance of science brought him fresh enjoyment.

Alexander von Humboldt said of him in 1851, "Few men have left upon me such an impression of intelligence on subjects of universal interest." Such being the case, it may be interesting to go back to those early days in his connection with the Society and discover, if possible, the sources from which the inspiration of this life took their rise, which so soon made him the President of the Society, and enabled him to fill that office so acceptably for thirty-six years.

We must remember that it was a formative period in geographical science. The teachers of that time had not yet really felt the power of Humboldt's life; Ritter and Guyot were just beginning their pioneer work, which was to lead the way from what might be called the domain of imaginary geography to a better understanding of the subject. Those were the days in which such strangely fantastic ideas as the existence of Symmes Hole were seriously and gravely discussed. It may seem odd, but we do not have to go back a quarter of a century in our history as a Society to find one of our most distinguished members describing with great zeal at one of our meetings the open Polar Sea. It may have had its purpose in covering up the unseemly void left by the collapse of Symmes Hole, but I doubt if it could be anything more than a graceful retreat from that untenable theory.

Judge Daly, with his logical mind, intent on gathering exact facts, could not possibly be satisfied with such subtle and filmy dreams, and his whole career was a silent reproof of such "easy chair" investigations. The facts, and nothing but facts, as the firm basis for true scientific knowledge, were what he sought, and he believed that they could be best accumulated through the agency of such an association as ours.

Judge Daly's interest in the Society dates from the year of its foundation, as he became a member on February 15th, 1855. His connection with the Society must have been a vital one, as he was elected a member of its Council on December 2nd, 1858.

Shortly after this time, in 1859, he presented his first book to the Society—a most characteristic act, which was repeated throughout his life, as there has been one long line of such gifts from that time to this. In this way an ever increasing-influence for good was started, as he was undoubtedly most instrumental in securing our large library, which ranks high among the world's collections upon geographical subjects.

Soon after this we find him reading some masterly remarks before the Society upon a letter from D. O. King, on a trip to Siam; in the course of which he shows a keen appreciation of the new facts brought out by the letter.

These two incidents illustrate to my mind the typical points in his character, while they show his deep interest in the Society as well. He was not content with gifts merely. His spirit longed for the benefit to be derived from study. He had what might be called a practical habit of mind. It made him strive to do something of lasting good in what he undertook, and it kept him from trifling and self-seeking.

In the same year, upon the occasion of the Humboldt Commemoration, he voiced the sentiments of the Society concerning that eminent geographer in words which are almost prophetic of his own career. I should like to read some of the sections of those resolutions, as I believe they fully represent our feelings at this time:

"*Resolved*, that we do not assemble to indulge a sentiment of regret at the termination of a life, which the great Author of the universe extended beyond the ordinary limit, but to express our sense of what that life has accomplished, and of the noble example it presented to the age which it adorned, and to all future time;"

"*Resolved*, that his intellectual preëminence is heightened by the beauty of his private life, his disinterestedness and gentleness, his ready sympathy with and encouragement of all who sought his aid or counsel, his strong faith in the future of humanity, and his manly love of liberty as an element of human progress."

At that time Judge Daly was already spoken of as "one who needed no commendation before this Society, since he devoted so much of his time, his means, and his counsels to its prosperity." He was evidently a self-made man in a very high sense—he was shaping and broadening his spirit, and his life thus became a means to a lofty end.

After the troubled times of the Civil War, when the existence of the Society seemed to be imperilled, he was the means of arousing new interest on the part of our citizens, and with the aid of the venerable Peter Cooper he brought new life to the organization.

His contributions to the intellectual progress of this Society, and of the community, were many and varied. He was a master in the use of his time and opportunities, and his researches enabled him to produce papers of value and interest along several different lines.

His first annual address upon the subject of geographical progress was read in January, 1873, and many more followed it. That was the year of a great revival in all lines of geographical research. The great western expeditions, which did so much to develop that section of our country, were beginning to bear fruit, and new Arctic explorations were being made. All these appealed strongly to him, and he emphasized with pardonable pride the fact that they were American.

We find, however, that he was not content with merely summarizing these purely geographical results, but that every subject relating to the study of the earth as a whole attracted his attention. The progress in Geology, Astronomy, Meteorology and Archæology was also watched, and the most important facts were gleaned for his papers.

Nor did this satisfy him. The Journal of the Society evinces many evidences of his activity in the domain of historical geography. Papers upon the "History of Physical Geography," "The Early History of Cartography," "Stanley's Verifications of Ptolemy's Geography," and kindred topics, were presented, in addition to what might be called the routine work of the geographer. Great practical works, such as the Suez and Panama Canals, the draining of the Zuider Zee, etc., were considered, and he was often the means of bringing about a symposium upon some subject of immediate interest when leading authorities would present their contributions in short public addresses. The many and famous gatherings of this nature upon the subject of Arctic work need only be alluded to in this connection as an illustration of his successful method of bringing about popular interest in an attractive manner.

Surely all these forms of activity, the organization and furthering of the objects of this Society, the prosecution of investigations on his own part and the inciting of activity on the part of others, as well as the formulation and carrying out of a policy which has placed our Society upon a solid basis, are to be classed as geographical work of a high character.

His interest in geography was not, however, merely theoretical. He took a lively interest in the men who devoted themselves to exploration. They were always welcome guests at his table, and he aided them with both advice and money. Many explorers and scientific men have been entertained at his hospitable home, and whenever honest and adventurous men sought his advice, they were sure to find him ready with encouragement and inspiration.

He was peculiarly genial. To his personal qualities he owed much, and no one came into close contact with him without feeling the magnetic power of his life.

What is the lesson of such a life if not the inspiration to future work? Under such an impulse do we not feel a deeper sense of duty and a keener appreciation of the opportunities of life?

If I were to review the history of this Society, which, in a large degree, is the history of the life of Judge Daly, I should divide it into three parts:

First, the early period of the struggle for existence, from 1854 to 1876. This term of years ended in the secure establishment of the Society in a home of its own, with an almost unrivalled collection of books and charts.

A second period of twenty-two years brings us to the time when the Society, by the gradual accumulation of the necessary funds, felt able to provide a suitable building for its purposes. No public aid brought about this result. It has been such a quiet growth that but very few of even our members know the position attained by the Society as the reward of careful planning. Much more remains to be done, however, before we can enter upon the true labors of such a Society and realize the full possibilities of our corporate existence.

The third epoch we have now entered upon, and I feel sure that if Judge Daly could say one word to us to-night, it would be to urge us to carry out the spirit of the motto of Prince Henry, the Navigator, "Talent de bien faire"—to cultivate the ability to be useful.

Geography can no longer, as in the past, be represented by a bent figure gazing into the unknown, puzzled by all it sees, but by a form, straight and erect, bearing aloft a torch, lighted to aid in the full study and development of our earth. The part we will play in this progress remains for us to determine.

The long and useful career of Judge Daly is ended. His genial and patriarchal figure will no longer be seen among us, but his spirit must live in our midst.

The Chairman then invited the Hon. Abram S. Hewitt to address the Society. Mr. Hewitt said:

I almost fear that the extemporaneous remarks I may be able to make will impair the pleasant impression left by Prof. Libbey, who has in such fitting terms described the value and beauty of Judge Daly's life. I think I must have known him longer than any one in this hall. He was but six years my senior, so that I may say I have known him all my life—certainly for more than sixty years. I did not know him when he was a boy attending the school of Alderman Brady, in company with James T. Brady, afterwards so distinguished at the bar, and with John McCloskey, who subsequently became Archbishop and a Cardinal in the Catholic Church. These eminent men, however, were never tired of recalling his sweet and lovely temper and the promise of his boyish days. It was true that he was born of humble people, but, if he had been rocked in a royal cradle and nurtured in the lap of luxury and refinement, he could not have had a loftier soul, and his character and his life would have been an honour to any family, however elevated and powerful.

I first saw Judge Daly at a meeting of the New York Literary Society, which had just been founded, and included all the rising young men of the day. The meetings were held in Apollo Hall, and I had been invited to attend some of them in order to take lessons in debate. Certainly the young men who formed the society justified their youthful reputation by their subsequent success. Besides Daly there were Samuel J. Tilden, Elijah Ward, Theodore Tomlinson, Lorenzo B. Shepard and, most prominent of all, McElligott, who was a teacher in the school of Forest and Mulligan, then the leading boys' school in New York.

When Daly rose to present his side of the argument on that evening he talked for three hours. The subject was handled from every possible point of view, and nothing of importance was left out. I remember well the masterly manner in which he dealt with the matter under discussion. He was answered by Tilden, who also talked for three hours, in order to do justice to his side of the question. The young men of that day were certainly giants in talk, if in nothing else. After the close of the discussion I was presented to Daly, and I remember his friendly manner and his willingness to give me advice as to how to handle questions in debate. He was then a young man of about twenty-one.

Of his early life he seldom spoke, even after I began to know him very intimately. We have spent many hours, days and weeks together in the privacy of his house and of my own. Once or twice he alluded to his experience in the merchant service, and I could see that his nature, innately refined and gentle as it was, must have suffered keenly under many a rude shock, and possibly from rough unkindness. The loss of his parents so early in life must have made things exceedingly hard for him; and that he was able, having had but a limited training in school and no other education but such as he acquired by his own unaided efforts, to rise by steady progression to the position he held in the world, is proof of his great gifts and of a strength of will which enabled him to overcome all obstacles.

His sense of honour, too, was of a very lofty kind. When the opportunity was given to him to advance himself by entering the office of a lawyer, who saw the promise of great things in him, he declined to take advantage of the opportunity until the term of his apprenticeship to the carpenter's trade was finished. The man to whom he was apprenticed had died, but the widow needed his services, and Daly's sense of duty kept him firmly to the obligation which he felt that he owed to a helpless woman.

In all his experience of life one thing was very remarkable—the harder his lot was, the more gentle and lovable he became. His knowledge was wide, and he improved every opportunity to add to it. He was in the truest sense a self-made man. If I were speaking to an audience of young people, I would hold Judge Daly up as an example—an inspiration, so to speak—because his life has shown what may be done by perseverance, integrity and courage in the face of obstacles which would deter most men and be a hindrance to success. Of course, he was not an ordinary boy, but one with peculiar and great gifts, to which, however, he was absolutely loyal, so that it may be said of him that he never wasted time or trifled with the talents which he possessed.

Prof. Libbey has spoken of his great services to the American Geographical Society. They cannot be overrated. It is perfectly true that to Judge Daly, and to him only, the Society owes its resurrection. He joined it in the first year of its existence, and soon took a prominent part in its transactions. When the Civil War came on, however, interest in scientific bodies naturally diminished, so that in 1860 it seemed as if the Geographical Society would be abandoned. I well remember his saying to me on one occasion:

"The Geographical Society is, I fear, dead. It has no money and no place in which to house its valuable library of books. We will give them to the Cooper Union, where they will be accessible to the public."

I advised him not to do this, but offered to house the books until such time as interest in the work of the Society might be revived and a home of its own be secured. He accepted the offer, and for about five years the books were kept in one of the alcoves of the Cooper Union, where the Society used to maintain a feeble existence. When the war was over, however, Judge Daly and his associates were able to revive the public interest in the work of the Society and to raise the funds required for the purchase of its present home. In this it was the privilege of Mr. Cooper and myself to assist.

On all geographical matters Judge Daly was a recognized authority. He was as well known abroad as at home, and when the great International Geographical Congress was held in Europe in 1895 he was chosen by unanimous consent to make the reply to the opening address of the Duke of York, the presumptive heir to the English throne. I was not so fortunate as to be present, but I was in Europe at the time, and I heard from others that the scene was most impressive and remarkable. It is certainly memorable that the representative of our country on that occasion, delegated

by the older nationalities to reply to the Prince, should be a man born in poverty and who owed his position to the favourable influence of free institutions. I refer to this matter here for the sake of recalling the wonderful dignity of character which Judge Daly manifested on all public occasions, and his insensibility to the deference due to rank and power. He was a gentleman to the manner born, and moved among men as the unconscious equal of nobles and princes.

Judge Daly was interested and well informed on all subjects of art and science. He was fond of poetry, he loved the fine arts, and enjoyed music, and in all of them he was more than a critic. Gifted with an unusually sweet and expressive voice, his singing was a treat to those who were permitted to enjoy it. When Thackeray came to America to lecture on the "Four Georges," it was my good fortune to meet him and the late C. P. Cranch at the Century Club after the lectures were over. Thackeray and Daly both had clear, low tenor voices, and the Judge would sing the Irish melodies he knew so well in a way to touch the heart most deeply. Thackeray would follow with those songs which have been preserved, such as "Little Billee" and the "Bouillabaisse," while Cranch, who, singularly enough, was gifted with the same kind of voice, would give us the melodies of our own country. The memory of these evenings spent in such company is very dear to me and will go with me to the grave. Ah! noctes cœnæque deûm.

Of his judicial career it is not necessary for me to speak. Others better qualified will testify to his long and honourable service upon the bench. I will refer, however, to his appointment to the Common Pleas at the early age of twenty-eight years. He had been a member of the Assembly, where he had gained the confidence and respect of Governor Bouck, who at that time made the judicial appointments. The term of Judge Inglis was about to expire. He was a candidate for reappointment, and his ability and reputation certainly entitled him to have his wish gratified. The Governor, however, was obstinate, and insisted upon appointing Judge Daly to the position. He promptly declined the offer and urged the Governor to reappoint Judge Inglis. The matter caused considerable discussion at the time, and certainly the general judgment of the Bar was that the Governor was wrong. Nevertheless, when it became apparent that he would not recede from his position, Judge Inglis personally requested Daly to take the place, and at length the latter consented and began his judicial career with fear and trepidation. The result, however, certainly justified the good opinion of the Governor. It happened that Daly sat longer upon the bench than any man of his day and generation. No one could have been more diligent and certainly no judge of our time has given greater evidence of learning and that breadth of intellect which is the essential quality of a great judge. After the position became elective, and at a time when party feeling ran very high, and when it was said that Tweed had decreed his dismissal, Judge Daly was re-elected by the unanimous vote of his fellow-citizens—a result which had never before and has never since occurred in this city. His retirement from the bench was a subject for general regret, and during the remainder of his life he occupied a position among his fellow-citizens almost unique. I happened to know personally that offers of public employment in conspicuous positions were made to him, but he preferred to pass the evening of his days in the quiet of his home, in the enjoyment of his library and the performance of such general duties as fall to the lot of citizens who become sages and are classed among the grand old men of the time. Certainly Judge Daly was happy in the last years of his life, so long as Mrs. Daly survived. Their union was a very perfect one, and the blow which left him alone manifested itself, as we all could see, in the decay of that vitality which had enabled him to accomplish so much useful work in the world.

Perhaps I ought to speak of the part which Judge Daly played in many of the most important political events of our time. During the Civil War he was constantly called in consultation by President Lincoln, Secretary Seward and Secretary Chase. His advice at critical moments was decisive, and his influence among the representatives of foreign powers, with whom he was on terms of intimate association, was of the greatest value. I doubt whether any man at that time wielded a more powerful and conservative influence than Judge Daly, and in the final work of reconstruction, his voice was always on the side of generous treatment toward the States who had sacrificed everything for what they believed to be right. The generosity of Judge Daly was conspicuous in the trying times for the South, which followed the close of the war. His house and his table were always open to his Southern friends, and they were made to feel that they were welcome, not merely to the hospitality, but to the generous consideration of their fellow-citizens of the North.

On the whole, I think I may say that no citizen of New York has ever led a more useful life, or left a more lovable name behind him, than our departed friend. He was an embodiment of sweetness and light, and I think I am justified in saying

None knew him but to love him,
Nor named him but to praise.

At the close of Mr. Hewitt's remarks, Prof. N. L. Britton, Director of the New York Botanical Garden, was introduced and spoke as follows:

Judge Daly was extremely fond of plants, trees and flowers; not only from the æsthetic standpoint of natural beauty, but he also had a profound appreciation of the uses of plants and their products, and of the more abstruse scientific questions of botany as well. I have talked with him along all these lines, and while he always disclaimed being a botanist, the conversation showed that he was well informed in a broad way about many of the problems of modern biological science. Plant distribution and plant utility were probably the topics which interested him most, owing to their intimate relationship to geography and economic science.

Both Mrs. Daly and the Judge were active participants in the movement, commenced in 1888, for the establishment of the New York Botanical Garden, which now, through their efforts and those of other public-spirited and philanthropic men and women, is rapidly developing, with the cordial co-operation of the City, into a noteworthy institution. Mrs. Daly was an influential member of the Committee from the Torrey Botanical Club which guided the movement, secured the necessary legislation, and raised by subscription a quarter of a million of dollars as a permanent endowment fund, in advance of any construction work being begun. Judge Daly threw all the weight of his irresistible personality and his trenchant argument into the endeavor, and subscribed liberally to the endowment. The early meetings of those most earnest in the movement were held at his residence, and he published a pamphlet for private distribution entitled "The Need of a Botanical Garden in New York," which was of very great assistance in informing others of the scope of the Committee's aspirations.

In the disposition of their estates both he and Mrs. Daly made most generous provision for the Botanical Garden, and it may be safely asserted that few have done more for botany in New York than our lamented friends.

They are commemorated in botany by a small but beautiful sunflower, which I found, in company with the Judge, while exploring in the vicinity of his country-place at Sag Harbor, and which I have described and dedicated to them under the name of *Helianthus Dalyi*.

Mr. John E. Parsons, President of the Association of the Bar, came forward on the invitation of the Chairman, and said:

"May I add a few words with particular reference to the simplicity and ingenuousness of Judge Daly's character? He was a most learned man, thoroughly versed in literature and law, philosophy, science and art. His learning did not consist in a mere smattering about a great many subjects. It was profound and exact. And he had a memory which never forgot. In contrast with this was an openness, a cordiality, a genuineness which were most attractive. I remember Judge Daly during a large part of his judicial life; from the time when I looked up to him with the awe and reverence with which a young lawyer regards a judge down to a later period when I was honored with his friendship and was permitted by him to meet on equal terms. From the beginning I was impressed with his kindness, the consideration which he showed to younger men, his patience and his unruffled amiability. In the summer of 1880 I was travelling in Europe with my family, and to the hotel at Munich where I was staying came Judge and Mrs. Daly. We were together for several days, visiting the many objects of interest and on occasion going to a concert hall or beer garden. The Judge was like a child, delighted with everything, interested in everything, appreciative and genial to the last degree. He knew more about beer than a brewer, about art than a painter, about music than a professor.

I do not see how it was possible for anybody to be brought into close relation with him without being drawn to him by the warmth of his sympathetic nature. He came occasionally to Lenox, where I spent my summers. I think that it was always a question whether in leaving he would remember to take his belongings with him. I am very sure that there was one, and perhaps more than one occasion when his keys went astray or his return railroad ticket was mislaid, or something else was missing. Even this was characteristic. He was a delightful companion, always willing to listen, never making a parade of his learning, interested in all the ordinary events of life, unassuming as a boy.

I ought not to close without a few words about Judge Daly as a lawyer. In a notable case argued subsequent to his retiring from the Bench he was with me as counsel. It had been thought better by those who were associated in the case that it should be suggested to the Judge that in his argument he should be as succinct and as directly to the point as was possible. His brief and his argument were models of condensed and direct reasoning. It was a surprise and a delight to me that it was possible for him to put in so small compass such a wealth of discussion. I took occasion to tell him so. He was pleased with all the ingenuousness of a child.

The place which Judge Daly's death left vacant it will be difficult to fill. Especially is that true here. It is not only because of the vastness of his information and his active and exceptional interest; it is as well because of the loveliness and the dignity of his character, which impressed all who were brought into association with him. New York may well mourn her loss.

At the conclusion of Mr. Parsons's address, the Chairman introduced Mr. Paul B. Du Chaillu, who spoke briefly of all that he owed to Judge Daly's recognition of his work as an explorer, and gave a few reminiscences which illustrated the Judge's interest in every phase of life and character.

On motion, the Society adjourned.

A regular meeting of the Society was held at Chickering Hall on Monday, February 19, 1900, at 8 o'clock P. M.

Vice-President Moore in the Chair.

The following persons, recommended by the Council, were elected Fellows:

Walter Jones Hewlett,
Herbert L. Bridgman,
Alexander Graham Bell.

The Chairman introduced Mr. T. C. Mendenhall, President of the Worcester Polytechnic Institute, who addressed the Society on the subject of the Alaska Boundary.

On motion, the Society adjourned.